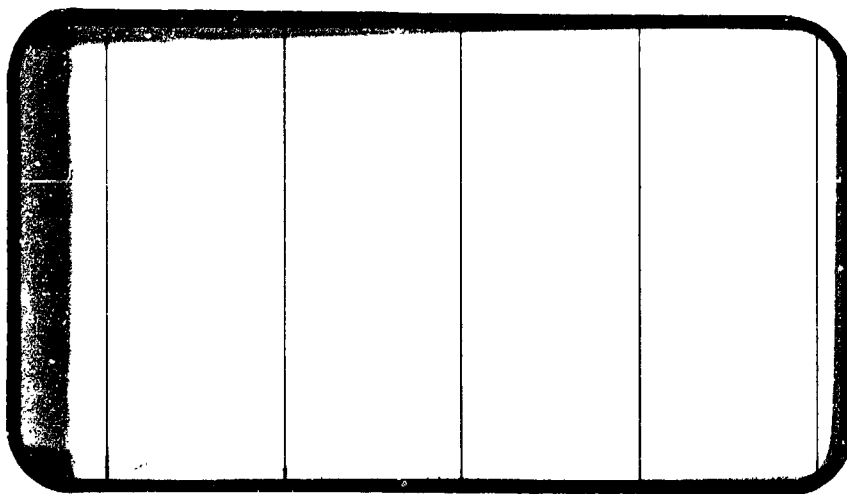


SA

# NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

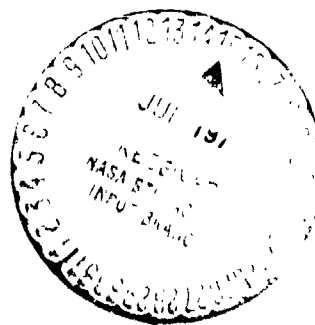


SPACE SHUTTLE

AEROTHERMODYNAMIC DATA REPORT

JOHNSON SPACE CENTER

HOUSTON, TEXAS



DATA Management services

SPACE DIVISION



CHRYSLER CORPORATION

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TESTS ON ROCKWELL ORBITER/TANK AND  
ORBITER ALONE CONFIGURATIONS (OH3A/OH3B)  
(Chrysler Corp.) 1057 P HC \$56.00

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PHASE CHANGE PAINT TESTS ON ROCKWELL  
ORBITER/TANK AND ORBITER ALONE CONFIGURATIONS  
(OH3A/OH3B)

By

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Prepared under NASA Contract Number NAS9-13247

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Johnson Space Center  
National Aeronautics and Space Administration  
Houston, Texas



WIND TUNNEL TEST SPECIFICS:

Test Number: AEDC HWTB VA289  
NASA Series No.: OH3A/OH3B  
Date: June 28-30, July 9-11, 1973

FACILITY COORDINATOR:

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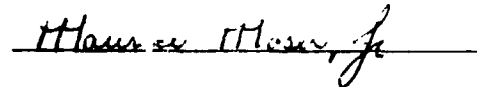
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## PHASE CHANGE PAINT TESTS ON ROCKWELL ORBITER/TANK AND ORBITER ALONE CONFIGURATIONS

### 1.0 INTRODUCTION

This report presents model information and data from wind tunnel tests conducted on 0.0175-scale models of the Rockwell International Space Shuttle orbiter and external tank in the AEDC Tunnel B Facility. The orbiter and tank were built to Rockwell lines VL70-000139 and VL78-000041, respectively, and their Rockwell model number is 21-OT. The phase change paint technique was used to determine aerodynamic heating rates and oil flow and Schlieren photographs were used for flow visualization.

The test was run in two phases. The first, designated OH3A, was conducted on the orbiter-tank configuration to determine basic heating rates and interference effects. This phase was performed in 16.5 hours from June 28 to June 30, 1973.

The second phase, OH3B, was conducted on the orbiter alone from July 9 to July 11, 1973, in 23 charge hours. Studies during this reentry portion of the test concentrated on the effects of the TPS tile system.

Engineering personnel responsible for this test were:

M. Quan - Wind Tunnel Operations  
C. Craig - Aerodynamic Heating

The model and all test data are unclassified.

### 2.0 SUMMARY DISCUSSION

A series of tests were conducted on 0.0175-scale models of a Rockwell International Space Shuttle orbiter and external tank configuration. These tests were conducted at the Air Force's Arnold Engineering Development Center (AEDC) in the Von Karman Facility's Tunnel B. Nominal Mach number for these tests was 8.0.

Parameters varied during the orbiter-tank (OH3A) phase of the testing included Reynolds numbers of .68 and  $3.7 \times 10^6$  per foot and angles of attack of  $0^\circ$  and  $-5^\circ$  at  $0^\circ$  sideslip. The majority of runs during this phase were made with the orbiter-tank mated configuration, but some tests were also made orbiter alone and tank alone to determine effects in the presence of the other. The tank was rolled  $180^\circ$  with respect to the orbiter for some runs so that comparisons could be made between a smooth tank top and the

top with normal piping in the presence of the orbiter. Several runs were also made with a boundary layer trip ring on the nose of the tank to simulate actual full scale boundary layer conditions. Normal model orientation was inverted in order to facilitate the taking of pictures on the side of the tank with the most external piping.

During the orbiter alone phase of the test (OH3B), Reynolds number was varied from .5 to  $3.7 \times 10^6$  per foot. The model was run at 25°, 30°, 35°, and 45° angles of attack and 0°, 1°, and 5° angles of yaw. Orbiter model was tested inverted.

Oil flow tests were attempted for 3 runs. The results were not satisfactory, so this type of flow visualization was terminated.

Due to the large size of the 0.0175-scale models, Schlieren photographs of the entire model could not be taken. Smaller 0.006-scale models (Rockwell model numbers 46-1 and 46-2) from a previous test were used. The 46-1 model was built to VL70-000139 lines. The 46-2 model was identical except the wing/cuff radius was 500" (full scale). Schlieren photographs of these two models were taken at  $\alpha = 30^\circ$  from 0° to 90° roll, in 15° increments, to determine the shock envelope for these two configurations. In addition, a planform view Schlieren was taken of the 0.0175-scale models. It did not show the entire model (due to its large size), but did show the bow shock interaction with the wing.

One of the primary objectives of OH3B was to evaluate the effects of the thermal protection system (TPS) tile system. Three different sized widths and depths were cut into the underside of orbiter models to simulate the tile gaps. Results of tests on these models can then be compared with regular smooth bottomed orbiters to determine the effects of various sized tile gaps on boundary layer transition and the resultant heating rates. Also, two TPS tiles were built up .005" during two runs to determine effects of tile height mismatches downstream.

It became necessary during the test to install aluminum nose caps on one of the tank models and on all of the orbiter models except one. This one was left unaltered for comparison purposes. The nose caps prevented excessive ablation and degradation of model nose contour due to the high tunnel operating temperatures and heating of the noses.

The model material properties used in the data reduction are as listed in Table 1 (Data Reduction Section). The recovery factors used are in Table 2.

### 3.0 MODEL DESCRIPTION

#### 3.1 GENERAL

The models were 0.0175-scale models of the Rockwell International Space Shuttle Orbiter and External Liquid Hydrogen - Oxygen Fuel Tank. The configurations were defined by Rockwell drawings VL70-000139 and VL78-000041. Model design and fabrication work was performed by Grumman Aerospace Corporation in Bethpage, New York.

The models were cast in one piece, using a Grumman epoxy compound called material "G". The specific material composition is proprietary to Grumman, but material properties taken from samples analyzed by the Grumman lab were provided. The external tank models were cast around a hollow steel sting while the orbiter models were cast around an epoxy-fiberglass sleeve.

Two external tank models were built with the orbiter-tank support system and the external fuel feed lines duplicated. These items were non-load bearing and were attached to the tank but not the orbiter. One of these models was painted with a stripe reference system. After the grid photographs were taken, the paint stripes were washed off with solvent and the model was used as a test article.

For certain runs, a thin metal band with small metal balls 0.078" in diameter (tack-welded on) was placed around the tank in the nose region to act as a transition strip. The center to center separation distance between the small balls was approximately three diameters or 0.234". The ring was placed three inches back from the nose in an axial direction.

There were nine orbiter models built according to the table below:

<u>No. of Models</u>	<u>Roughness</u>	<u>Elevons (LH, RH)</u>
3	Smooth	+5°, 0°
1	Smooth	+10°, -40°
1	Rough (1)	+5°, 0°
1	Rough (2)	+5°, 0°
1	Rough (3)	+5°, 0°
1	Rough (4)	+5°, 0°
1	Smooth	+5°, 0° (Paint Stripe)

The roughness models have grids machined into the underside of the vehicle to simulate the thermal protection system tiles. Figure 3 shows the area with the machined grid for roughness (1), (2) and (3). Roughness (4) was cut according to Figure 4.

In addition, two IPS tiles were built up approximately .005" with a heat-resistant epoxy paint during the test on the Rough (2) model to study the downstream effects. The two tiles built up are shown in Figure 3.

In order to obtain valid melting rate data, the top wing surface was slabbed from the elevon hinge line to the trailing edge to increase material thickness. The bottom surface of the wing was held to contour, even when the elevons were deflected.

Elevon deflections were cast in the model. The rudders on all models had a 20° half angle (40° total) flare.

One orbiter was painted with a stripe reference system to facilitate data reduction and analysis. It was not used as a test article.

A dog-leg sting mated to an AEDC offset knuckle was used to obtain the required orbiter alone angles of attack. The orbiter-tank combination was supported by a single sting that branched into two separate stings which entered the aft end of each component.

The orbiter-tank combination was not tested while yawed. Yaw of the orbiter alone was obtained by rolling the orbiter about its axis while at angle of attack. The specific roll angle was obtained by rolling the aluminum sleeve-core about the sting and pinning it at predetermined and pre-drilled locations on the sting. The table below lists the angles of attack and roll necessary to get effective angles of yaw:

<u>To obtain <math>\psi = 1^\circ</math></u>	<u>To obtain <math>\psi = 5^\circ</math></u>
$\alpha = 25^\circ, \theta = 2.37^\circ$	$\alpha = 25^\circ, \theta = 11.68^\circ$
$\alpha = 30^\circ, \theta = 2.00^\circ$	$\alpha = 30^\circ, \theta = 9.92^\circ$
$\alpha = 35^\circ, \theta = 1.74^\circ$	$\alpha = 35^\circ, \theta = 8.67^\circ$
$\alpha = 45^\circ, \theta = 1.41^\circ$	$\alpha = 45^\circ, \theta = 7.05^\circ$

Before starting OH3B, it was necessary to install aluminum nose caps on all the orbiter models except one which was left unaltered for comparison purposes.

### 3.2 MODEL NOMENCLATURE

Since there were no removable parts on these models and no configuration variables, individual components were not listed on the run schedule. However, for information, the following nomenclature symbols have been assigned to the components of the configurations tested:

B <sub>17</sub>	Body
M <sub>4</sub>	OMS Pod
C <sub>7</sub>	Canopy
F <sub>5</sub>	Body Flap
W <sub>103</sub>	Wing
E <sub>22</sub>	Elevon
V <sub>7</sub>	Vertical Tail
R <sub>5</sub>	Rudder
T <sub>10</sub>	External Tank

A new set of symbols were generated during this test to differentiate between the models.

	<u>Nomenclature</u>	<u>Description</u>	<u>Model Assembly No.</u>
<u>OH3A</u>	O	Orbiter, smooth bottom, elevons +5°, 0°	550-27 or 550-28
	T	External Tank	553-2 or
	T(with trip ring)	External Tank with transition ring on	553-4
<u>OH3B</u>	S-27	Smooth bottom, elevons +5°, 0°	550-27
	S-28	Smooth bottom, elevons +5°, 0°	550-28
	S-22X	Smooth bottom, elevons +5°, 0°, no metal nose cap	550-22X
	R <sub>1</sub>	Machined grid on bottom surface .006" wide x .006" deep	550-21
	R <sub>2</sub>	Machined grid on bottom surface .016" wide x .016" deep	550-23
	R <sub>3</sub>	Machined grid on bottom surface .028" wide x .028" deep	550-24
	R <sub>4</sub>	Machined grid on bottom of wings and wing L.E.'s, .016" L.H. and .006" R.H.	550-25



<u>Nomenclature</u>	<u>Description</u>	<u>Model Assembly No.</u>
R5	R2 with two tiles on forward body built up .005" (see Figure 3)	550-23
E	Smooth bottom, elevons +10°, -40°	

### 3.3 DIMENSIONAL DATA

See following component sheets.

### 4.0 TEST FACILITY DESCRIPTION

The Arnold Engineering Development Center (AEDC) is an Air Force Facility located in Tullahoma, Tennessee. The tunnel used, Tunnel B, is located in the Von Karman Facility portion of this center. Engineering and other technical operations in this tunnel are performed by contractor personnel of ARO, Inc.

Tunnel B is a continuous, closed circuit, variable density wind tunnel with an axisymmetric contoured nozzle and a 50-inch diameter test section. The tunnel can be operated at a nominal Mach number of 6 or 8 at stagnation pressures from 20 to 300 and 50 to 900 psia, respectively, and at a stagnation temperature of up to 1350°K. The model may be injected into the tunnel for a test run and then retracted for model cooling or model changes without interrupting the tunnel flow.

### 5.0 TEST OPERATING PROCEDURES

#### 5.1 SET UP

The tunnel operation and model handling were accomplished by AEDC personnel.

Both the orbiter-tank and the orbiter alone configurations were installed inverted. Orbiter alone roll angles required to obtain effective yaw angles were obtained by rolling the model on its axis and pinning its aluminum sleeve-core to predrilled holes in the sting.

Four cameras were used during the orbiter-tank (OH3) testing. They were located to photograph the top, bottom, upper side and lower side. During the orbiter alone (OH3B) testing, only three cameras were used: top, bottom, and side.

## 5.2 TESTING PROCEDURE

Just prior to each run, the initial temperature of the model was taken using a contact thermometer. This thermometer consisted of a thermocouple mounted at the end of a probe which was placed against the model surface.

Before and after a run, the model was in an injection chamber outside of the test section. Only after flow was established were the model and support system injected into the airstream. Continuous sequence pictures were taken throughout the test period, after which the model was retracted. The test period was determined by the paint melt temperature and estimated heating rates.

After injection and retraction from the tunnel flow, the model was removed from the sting and a freshly painted model installed in its place.

## 6.0 INSTRUMENTATION

The following items were required for the test:

1. Four 70mm cameras on OH3A for the orbiter-tank testing. Three cameras for the orbiter alone testing on OH3B.
2. A polaroid camera for more detailed shots of selected runs after the model was removed from the sting.
3. A digital contact thermometer for recording model initial temperature.
4. A set-up to take Schlieren photographs.
5. A video tape television set-up with capability for on-line monitoring and replay.

## 7.0 DATA REDUCTION

### 7.1 GENERAL

The phase change paint technique is an approximate method of determining aerodynamic heating rates from hypersonic wind tunnel tests. Briefly, it involves the spray application of a temperature-sensitive paint to a model prior to installation in a wind tunnel. The paint dries in a thin coat of opaque solid which, when heated to a given temperature, will turn into a colorless liquid. Sudden exposure (by injection into the air flow) to a hypersonic airstream will initiate aerodynamic heating

of the model surface. The paint will melt (change phase) when the local surface temperature reaches its calibrated melt temperature. The propagation of this melt line is recorded by a camera which takes pictures at a preset rate. Later, each frame can be correlated with the amount of time the model had been in the flow to obtain aerodynamic heating rates.

A paint stripe reference system was on one orbiter and one external tank (Figures 5a, 5b, 6). Pictures were taken of all configurations tested at the various angles of attack and roll. These pictures are presented in this report so the actual position of various melt lines can be determined from the paint stripe models despite any distortion due to perspective. With the orbiter alone runs at 0° roll, there were sufficient runs of one configuration to warrant superimposing the grid on the orbiter outline and then reproducing them.

## 7.2 DETERMINATION OF HEATING RATES

First, the adiabatic wall temperature ( $T_{AW}$ ) must be determined. To obtain this, the ratio of adiabatic wall temperature to stagnation temperatures ( $T_0$ ) is calculated by:

$$\frac{T_{AW}}{T_0} = .867 + .133 \sin^{1.55} \delta$$

Where:  $\delta = \alpha + \theta$

$\alpha$  is the model angle of attack

$\theta$  is the surface deflection relative to the model centerline (usually zero or assumed zero).

This ratio,  $\frac{T_{AW}}{T_0}$ , is called the "recovery factor" ( $R_T$ ). It represents the ratio of the free stream dynamic temperature recovered at the (model) wall (Table 2).

Since  $T_0$  is measured,  $T_{AW}$  was determined from  $\left[ \frac{T_{AW}}{T_0} \right] \times T_0$ .

Using  $T_{AW}$ , the value of the parameter  $\bar{T}$  is calculated:

$$\bar{T} = \frac{T_{PC} - T_{IN}}{T_{AW} - T_{IN}}$$

Where:  $T_{PC}$  = phase change paint melt temperature (°F)

$T_{IN}$  = model initial temperature (°F)

$T_{AW}$  = adiabatic wall temperature

Using  $\bar{T}$ ,  $\beta$  is determined from an iterative solution of:

$$1 - \bar{T} = e^{\beta^2} (1 - \operatorname{erf} \beta)$$

With  $\beta$  obtained from the above expression, the heat transfer coefficient ( $h$ ) is determined from:

$$h = \frac{\beta \sqrt{K \rho C_p}}{\sqrt{t}}$$

Where:  $K$  = thermal conductivity of the model material (BTU/Ft-SEC-F°)

$\rho$  = density of model material (lb/ft<sup>3</sup>)

$C_p$  = specific heat of model material (BTU/lb-F°)

$t$  = time in seconds

The aerodynamic heating rate  $\dot{q}$  is calculated from:

$$\dot{q} = h(T_{AW} - T_{PC})$$

The stagnation point heat transfer coefficient and heating rate is calculated using the equations below:

$$h_s = (.768)(C_p)(P_r^{-.6})(\rho_w \mu_w)^{.1}(\rho_s \mu_s)^{.4} \sqrt{\frac{dVe}{\alpha x}}$$

Where:  $P_r = \frac{\mu C_p}{K}$  ( $\mu$ ,  $C_p$  and  $K$  for air)

$\rho_w$  = air density along model wall (lb<sub>m</sub>/ft<sup>3</sup>)

$\rho_s$  = stagnation density (lb<sub>m</sub>/ft<sup>3</sup>)

$\mu_w$  = air viscosity along model wall (lb<sub>m</sub>/ft-sec)

$\mu_s$  = stagnation air viscosity (lb<sub>m</sub>/ft-sec)

$h_s$  = theoretical thin film heat transfer coefficient (BTU/ft<sup>2</sup>-sec-F°)

and, 
$$\frac{dVe}{dx} = \frac{1}{N_R} \sqrt{2RgT_0} \left[ 1 - \frac{1}{P_1 P_2} \right]$$

$N_R$  = nose radius (Ft)

$R$  = gas constant =  $53.35 \left( \frac{\text{Ft-lb}_f}{\text{lb}_m - ^\circ\text{R}} \right)$

$g$  = gravitational constant =  $32.2 \left( \frac{\text{lb}_m \text{ Ft}}{\text{lb}_f \text{ sec}^2} \right)$

$T_0$  = stagnation temperature ( $^\circ\text{R}$ )

$P_1 = \left[ \frac{\gamma + 1}{2} M_\infty^2 \right]^{\frac{\gamma}{\gamma - 1}}$

$\gamma$  = ratio of specific heats (air)

$M_\infty$  = free stream Mach number

$P_2 = \left[ \frac{\frac{\gamma}{2} M_\infty^2 + 1}{\gamma - 1} \right]^{\frac{1}{\gamma - 1}}$

The theoretical stagnation point heating rate ( $\dot{q}_s$ ) is calculated from:

$$\dot{q}_s = h_s (T_{AW} - T_{PC})$$

### 7.3 MATERIAL PROPERTIES AND RECOVERY FACTORS

Because each model had a slightly different set of  $C_p K$  values, a weighted average was used to ease the operational problems involved in having sets of values unique to each model. The following values were used in the data reduction for all models:

TABLE 1

$T_{PC} (^\circ\text{F})$	$\sqrt{\rho C_p K} \text{ (BTU/FT}^2\text{- SEC}^{1/2}\text{- }^\circ\text{F)}$
113	.0475
125	.0482
131	.0486
150	.0496
169	.0506
175	.0509
200	.0519

TABLE 1 (Concluded)

$T_{PC}$ (°F)	$\sqrt{\rho C_p K}$ (BTU/FT <sup>2</sup> - SEC - °F)
225	.0520
250	.0535
300	.0544
350	.0550
400	.0555
450	.0553
500	.0542

Values of the recovery factor  $T_{AW}/T_0$  used in the data reduction are given below:

TABLE 2

Angle of Attack (Deg.)	Recovery Factor ( $T_{AW}/T_0$ )	
	Windward View	Side and Upper Surface Views
25	.902	.90
30	.912	.90
35	.923	.90
45	.944	.90

## 8.0 DATA PRESENTATION

8.1 The data presented in this report are contour plots which show isotherms for selected frames of data and corresponding tabulated data. The frame numbers on the isotherms correspond to the tabular listing following each contour plot.

The contour plots are broken down into four groups: (T), top camera; (US), upper side camera; (LS), lower side camera; and (B), bottom camera. On each contour there are assigned frame numbers.

In column one of the tabular listing labeled (PIC), each frame number corresponds to the contour plot number and camera configurations.

In a separate section are paint stripe tracings presenting grid patterns of preselected stations of  $X_0$  and  $Y_0$  for each  $\alpha$  or  $\beta$  change or both.

MODEL COMPONENT: BODY - B17

GENERAL DESCRIPTION: Fuselage, 3 Configuration, Lightweight Orbiter

per Rockwell Lines VL70-000139

Model Scale = 0.01755

DRAWING NUMBER: VL70-000139

<u>DIMENSIONS:</u>	<u>FULL-SCALE</u>	<u>MODEL SCALE</u>
Length - IN.	<u>1290.3</u>	<u>22.58025</u>
Max. Width - IN.	<u>267.6</u>	<u>4.6830</u>
Max. Depth - IN.	<u>244.5</u>	<u>4.27875</u>
Fineness Ratio	<u>4.82175</u>	<u>4.82175</u>
Area - FT <sup>2</sup>		
Max. Cross-Sectional	<u>386.67</u>	<u>0.11842</u>
Planform	<u>          </u>	<u>          </u>
Wetted	<u>          </u>	<u>          </u>
Base	<u>          </u>	<u>          </u>

MODEL COMPONENT: OMS Pod - M<sub>4</sub>

GENERAL DESCRIPTION: Configuration 3 per Rockwell Lines VL70-000139

NOTE: M<sub>4</sub> identical to M<sub>3</sub>, except intersection to fuselage.

Model Scale = 0.75,

DRAWING NUMBER VL70-000139

<u>DIMENSION:</u>	<u>FULL SCALE</u>	<u>MODEL SCALE</u>
Length - IN	<u>346.0</u>	<u>6.0550</u>
Max Width - IN	<u>108.0</u>	<u>1.890</u>
Max Depth - IN	<u>113.0</u>	<u>113.0</u>
Fineness Ratio	<u>          </u>	<u>          </u>
Area - FT <sup>2</sup>	<u>          </u>	<u>          </u>
Max Cross-Sectional	<u>          </u>	<u>          </u>
Planform	<u>          </u>	<u>          </u>
Wetted	<u>          </u>	<u>          </u>
Base	<u>          </u>	<u>          </u>

∅ of OMS Pods

WP = 463.9 INFS: WP = 400 + 63.9 = 463.9

BP = 80.0 INFS

Length: 1214.0 to 1560.0 = 346.0 INFS



MODEL COMPONENT: Canopy - C7

GENERAL DESCRIPTION: Configuration 3 per Rockwell Lines VL70-000139

Insufficient information to complete dimensional data at this time.

Model Scale = 0.0175

DRAWING NUMBER VL70-000139

<u>DIMENSION:</u>	<u>FULL SCALE</u>	<u>MODEL SCALE</u>
Length ( $X_0 = 433$ to $X_0 = 670$ ) - in. FS	<u>432.7</u>	<u>7.57225</u>
Max Width	<u>571.40</u>	<u>9.99950</u>
Max Depth ( $Z_0 =$ to $Z_0 = 501$ ) - in FS	<u></u>	<u></u>
Fineness Ratio	<u></u>	<u></u>
Area		
Max Cross-Sectional	<u></u>	<u></u>
Planform	<u></u>	<u></u>
Wetted	<u></u>	<u></u>
Base	<u></u>	<u></u>

MODEL COMPONENT: F5 Body Flap

GENERAL DESCRIPTION: 3 Configuration per Rockwell Lines VL70-000139

Scale Model = 0.0175

DRAWING NUMBER VL70-000139

<u>DIMENSION:</u>	<u>FULL SCALE</u>	<u>MODEL SCALE</u>
Length - in	<u>84.70</u>	<u>1.48225</u>
Max Width - in	<u>267.6</u>	<u>4.6830</u>
Max Depth	<u>          </u>	<u>          </u>
Fineness Ratio	<u>          </u>	<u>          </u>
Area - Ft <sup>2</sup>		
Max Cross-Sectional	<u>          </u>	<u>          </u>
Planform	<u>142.5</u>	<u>0.04365</u>
Wetted	<u>          </u>	<u>          </u>
Base	<u>38.0958</u>	<u>0.01167</u>

MODEL COMPONENT: WING-W 103

GENERAL DESCRIPTION: Configuration 3 Orbiter per Lines VL70-000139.

NOTE: Same planform as W87, except dihedral at TE

Scale Model = 0.0175

TEST NO.

DWG. NO. VL70-000139

DIMENSIONS:

FULL-SCALE

MODEL SCALE

## TOTAL DATA

Area (Theo.) Ft<sup>2</sup>

Planform

Span (Theo) In.

Aspect Ratio

Rate of Taper

Taper Ratio

Dihedral Angle, degrees (@ TE of Elevon)

Incidence Angle, degrees

Aerodynamic Twist, degrees

Sweep Back Angles, degrees

Leading Edge

Trailing Edge

0.25 Element Line

Chords:

Root (Theo) B.P.C.O.

Tip, (Theo) B.P.

MAC

Fus. Sta. of .25 MAC

W.P. of .25 MAC

B.L. of .25 MAC

## EXPOSED DATA

Area (Theo) Ft<sup>2</sup>

Span, (Theo) In. BP108

Aspect Ratio

Taper Ratio

Chords

Root BP108

Tip 1.00 b

2

MAC

Fus. Sta. of .25 MAC

W.P. of .25 MAC

B.L. of .25 MAC

Airfoil Section (Rockwell Mod NASA)

XXXX-64

Root b =

2

Tip b =

2

Data for (1) of (2) Sides

Leading Edge Cuff

Planform Area Ft<sup>2</sup>

Leading Edge Intersects Fus M. L. @ Sta

Leading Edge Intersects Wing @ Sta

MODEL COMPONENT: ELEVON E-22

GENERAL DESCRIPTION: 3 Configuration per W103 Rockwell Lines

VL70-000139 data for (1) of (2) sides

Scale Model = 0.0175

DRAWING NUMBER: VL70-000139

<u>DIMENSIONS:</u>	<u>FULL-SCALE</u>	<u>MODEL SCALE</u>
Area - FT <sup>2</sup>	205.52	0.06294
Span (equivalent)- IN.	353.34	6.18345
Inb'd equivalent chord	114.78	2.00865
Outb'd equivalent chord	55.00	0.9625
Ratio movable surface chord/ total surface chord		
At Inb'd equiv. chord	.208	.208
At Outb'd equiv. chord	.400	.400
Sweep Back Angles, degrees		
Leading Edge	0.00	0.00
Tailing Edge	-10.24	-10.24
Hingeline	0.00	0.00
Area Moment (Normal to hinge line) - FT <sup>3</sup>	1548.07	0.00829
Product of Area Moment		

MODEL COMPONENT: VERTICAL - V 7

GENERAL DESCRIPTION: Centerline vertical tail, double wedge airfoil with  
rounded leading edge.

Model Scale = 0.0175

DRAWING NUMBER:

VL70-000139

VL70-000095

DIMENSIONS:

FULL-SCALE

MODEL SCALE

TOTAL DATA

Area (Theo) $\text{Ft}^2$	<u>425.92</u>	<u>0.13044</u>
Planform		
Span (Theo) In	<u>315.72</u>	<u>5.52520</u>
Aspect Ratio	<u>1.675</u>	<u>1.675</u>
Rate of Taper	<u>0.507</u>	<u>0.507</u>
Taper Ratio	<u>0.404</u>	<u>0.404</u>
Sweep Back Angles, degrees		
Leading Edge	<u>45.000</u>	<u>45.000</u>
Trailing Edge	<u>26.249</u>	<u>26.249</u>
0.25 Element Line	<u>41.230</u>	<u>41.230</u>
Chords:		
Root (Theo) WP	<u>268.50</u>	<u>4.60875</u>
Tip (Theo) WP	<u>108.47</u>	<u>1.89222</u>
MAC	<u>199.81</u>	<u>3.49667</u>
Fus. Sta. of .25 MAC	<u>1463.5</u>	<u>25.6225</u>
W. P. of .25 MAC	<u>635.520</u>	<u>11.22164</u>
B. L. of .25 MAC	<u>0.00</u>	<u>0.00</u>
Airfoil Section		
Leading Wedge Angle Deg	<u>10.000</u>	<u>10.000</u>
Trailing Wedge Angle Deg	<u>14.920</u>	<u>14.920</u>
Leading Edge Radius	<u>2.00</u>	<u>0.0350</u>
Void Area	<u>12.17</u>	<u>0.00403</u>
Blanketed Area		

MODEL COMPONENT: RUDDER - R5

GENERAL DESCRIPTION: 2A, 3 and 3A Configuration per Rockwell Lines

VL70-000095

Model Scale = 0.0175

DRAWING NUMBER: VL70-000139  
VL70-000095

<u>DIMENSIONS:</u>	<u>FULL-SCALE</u>	<u>MODEL SCALE</u>
Area - FT <sup>2</sup>	<u>106.38</u>	<u>0.03258</u>
Span (equivalent) - IN.	<u>201.0</u>	<u>3.5175</u>
Inb'd equivalent chord	<u>91.585</u>	<u>1.60274</u>
Outb'd equivalent chord	<u>50.833</u>	<u>0.88958</u>
Ratio movable surface chord/ total surface chord		
At Inb'd equiv. chord	<u>0.400</u>	<u>0.400</u>
At Outb'd equiv. chord	<u>0.400</u>	<u>0.400</u>
Sweep Back Angles, degrees		
Leading Edge	<u>34.83</u>	<u>34.83</u>
Tailing Edge	<u>26.25</u>	<u>26.25</u>
Hingeline	<u>34.83</u>	<u>34.83</u>
Area Moment (Normal to hinge line)- FT <sup>3</sup>	<u>526.13</u>	<u>0.00282</u>
Product of Area and Mean Chord		

MODEL COMPONENT: EXTERNAL TANK - T10

GENERAL DESCRIPTION: External Oxygen Hydrogen Tank, 3 Configuration,  
per Rockwell Lines VL78-000041 and VL72-000088

Model Scale = 0.0175

DRAWING NUMBER

VL72-000088

VL78-000041

DIMENSION:

FULL SCALE

MODEL SCALE

Length - IN (Nose @  $X_T = 309$ )

1865

32.63750

Max Width (Dia) - IN.

324

5.670

Max Depth

-

-

Finess Ratio

5.75617

5.75617

Area -  $FT^2$

Max Cross-Sectional

572.555

0.17534

Planform

Wetted

Base

WP of Tank Centerline ( $X_T$ ) IN.

400.0

7.00

NOTE: ALL DIMENSIONS  
IN INCHES

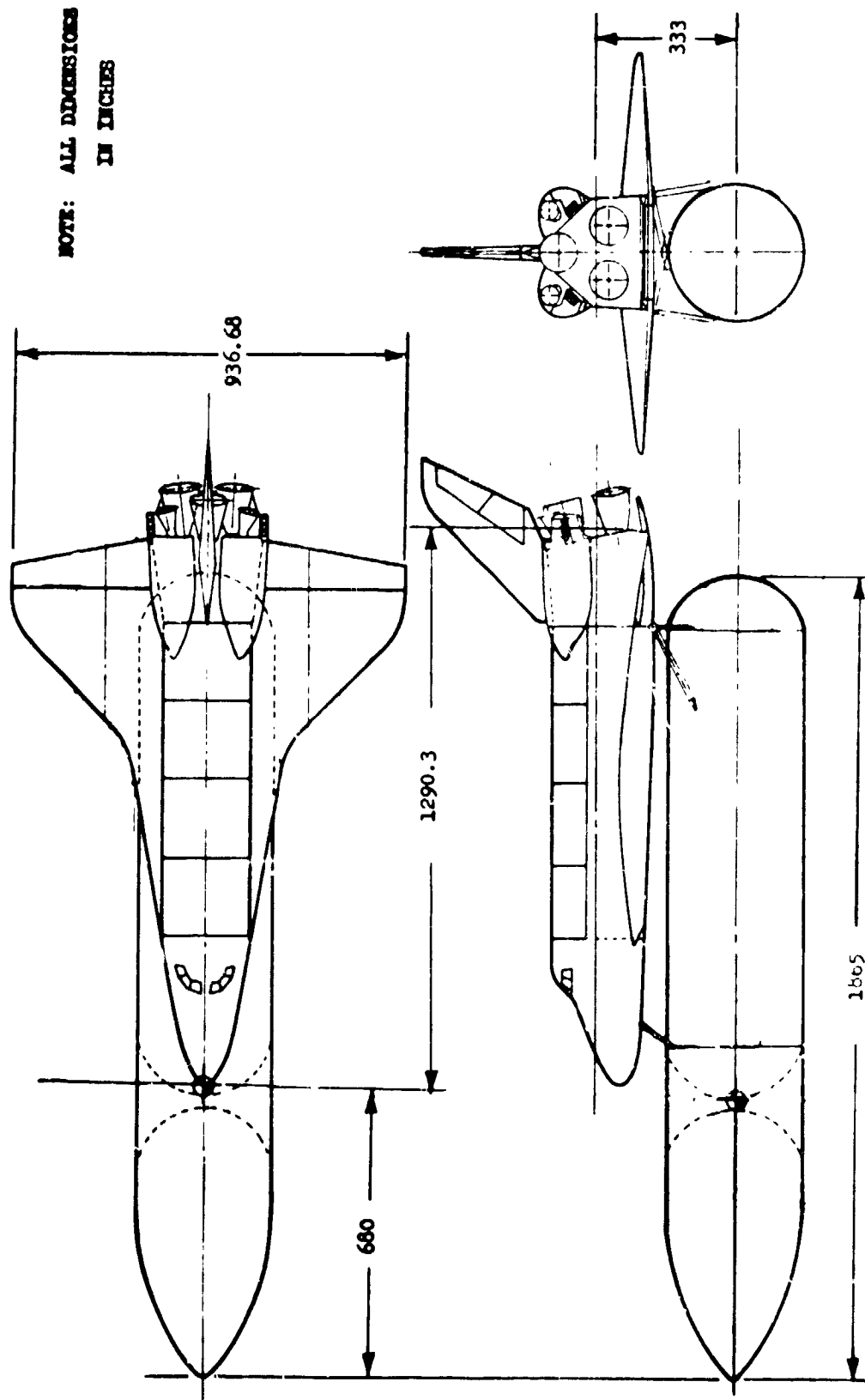


Figure 1. Rocket/Tank 3-view



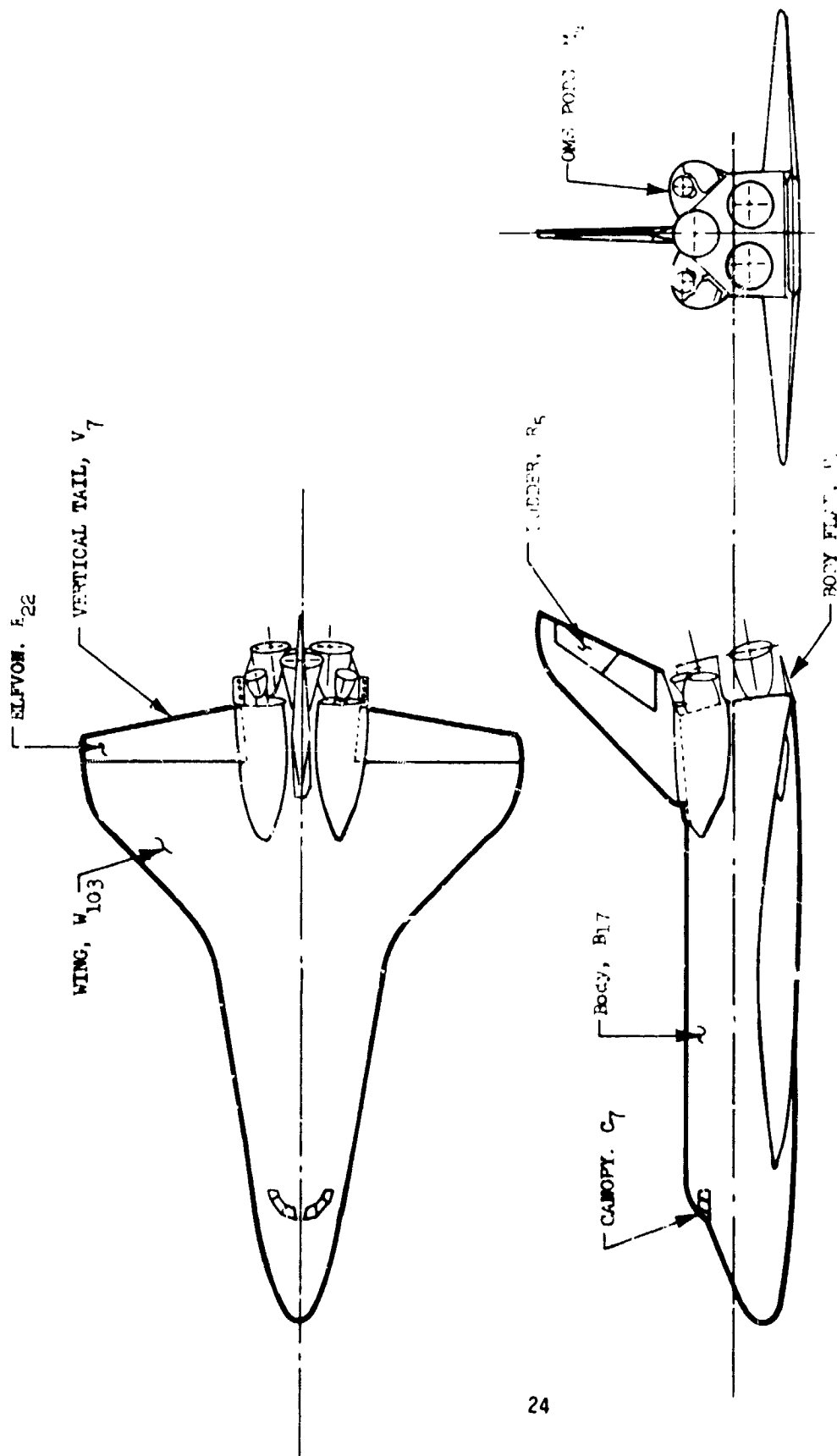


Figure 2. Orbiter 3-View

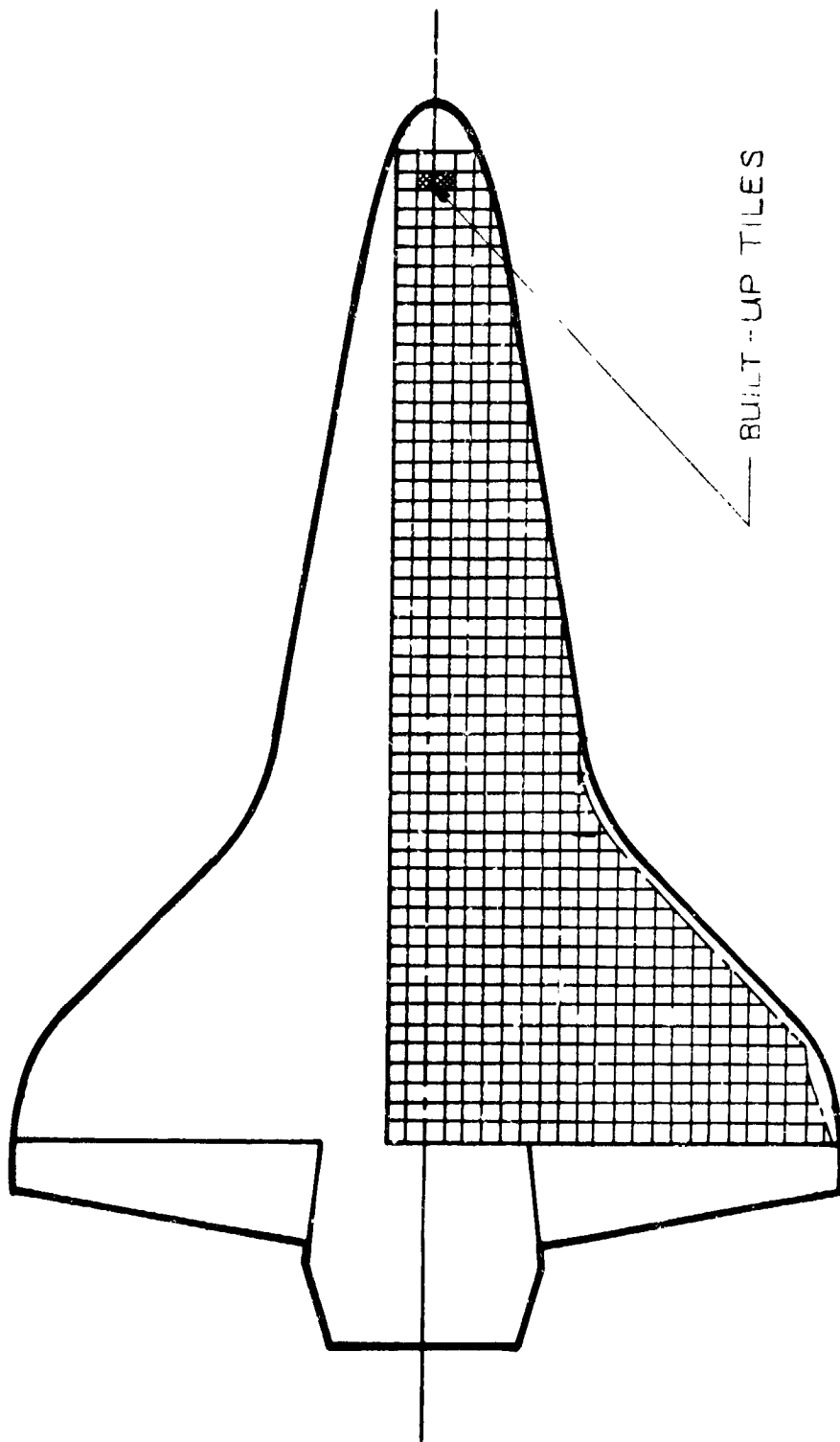


Figure 3. Square Machined Grid

WING 1 - LEFT HAND SIDE (PILOT'S VIEW) GROOVES 0.016" WIDE x 0.016" DEEP  
 WING 2 - RIGHT HAND SIDE (PILOT'S VIEW) GROOVES 0.006" WIDE x 0.006" DEEP

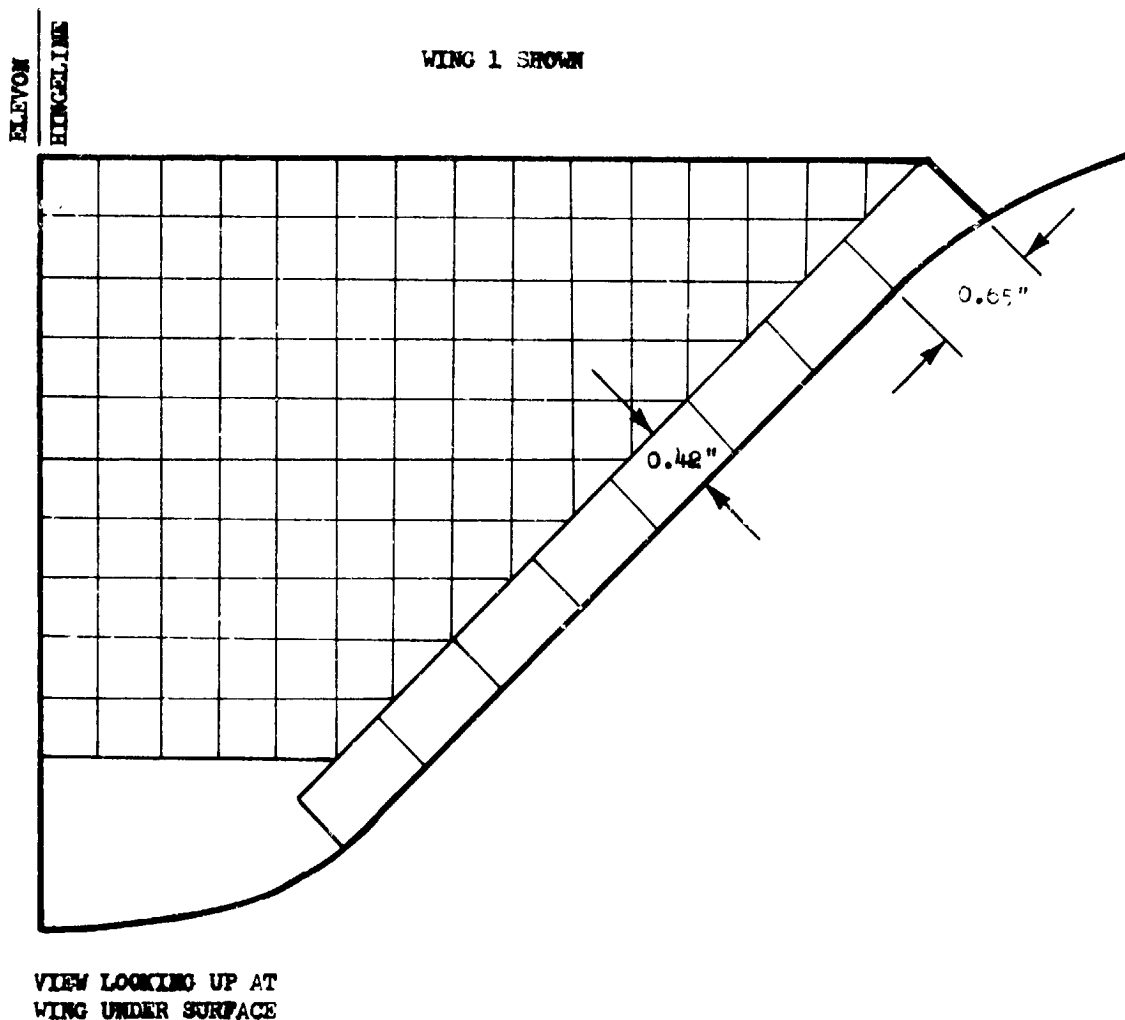


Figure 4. Wing Groove Model (B4)

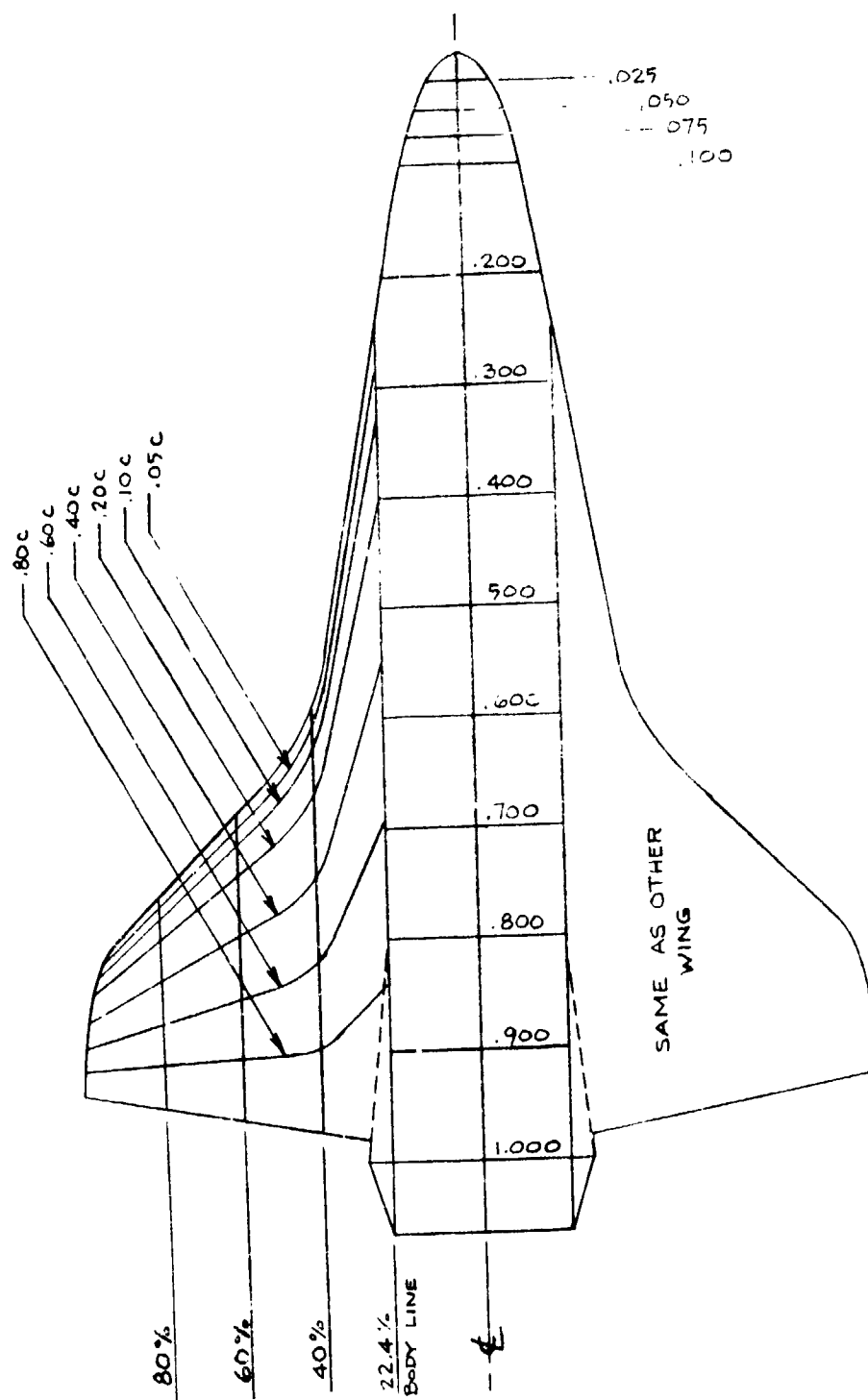


FIG 5a PAINT STRIPE PATTERN~ORBITER

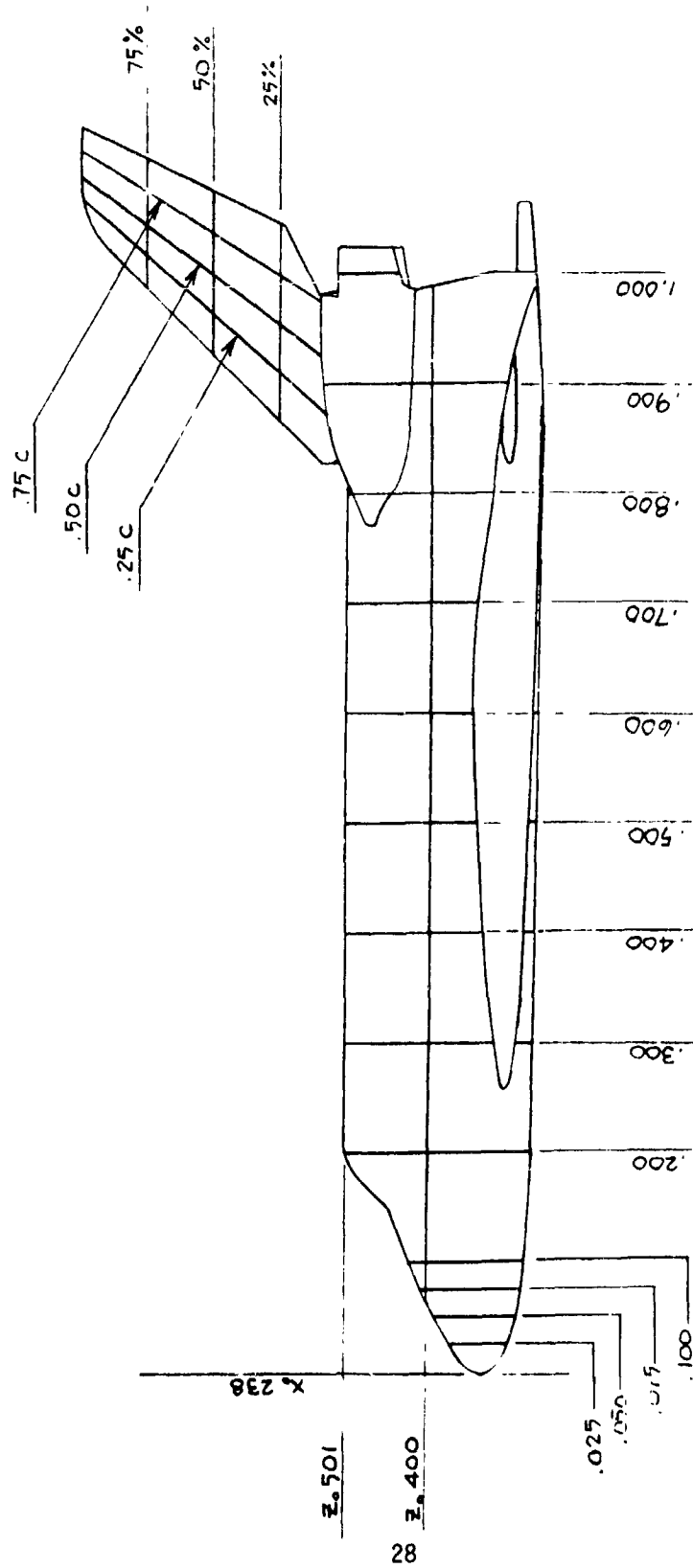


FIG 5b PAINT STRIPE PATTERN~ORBITER

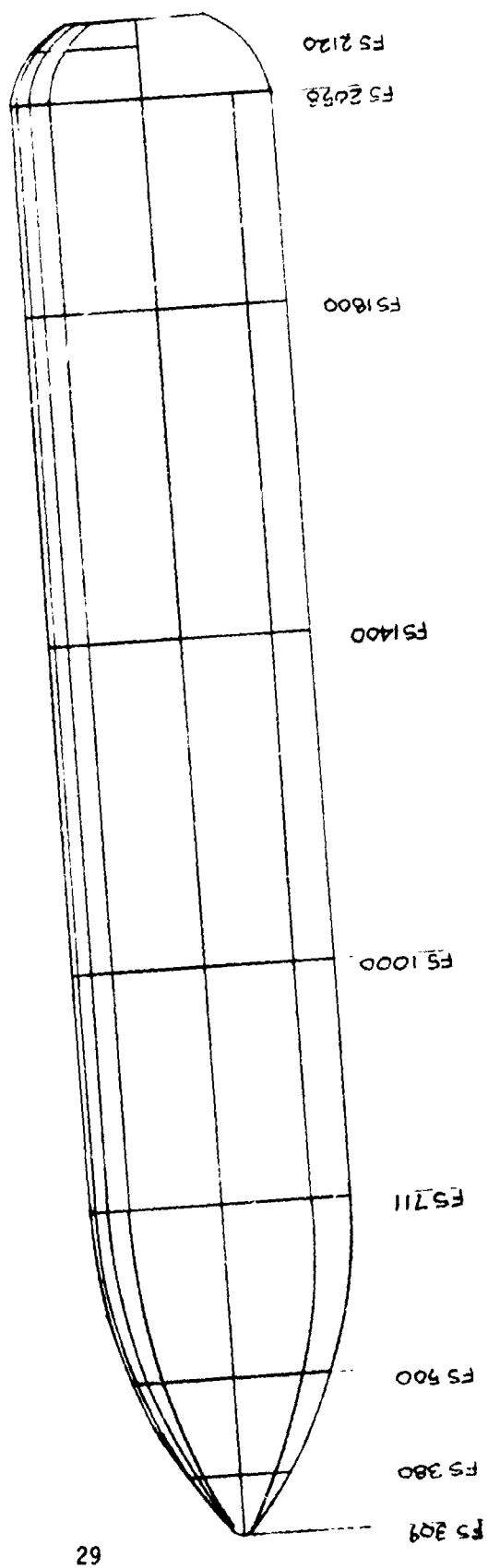
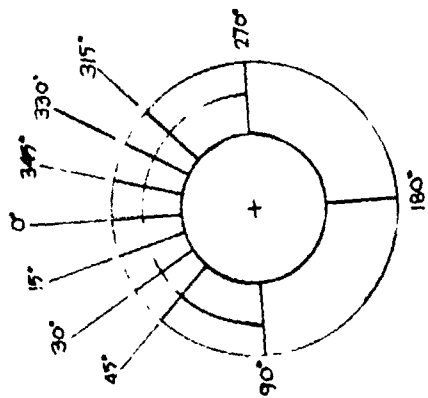
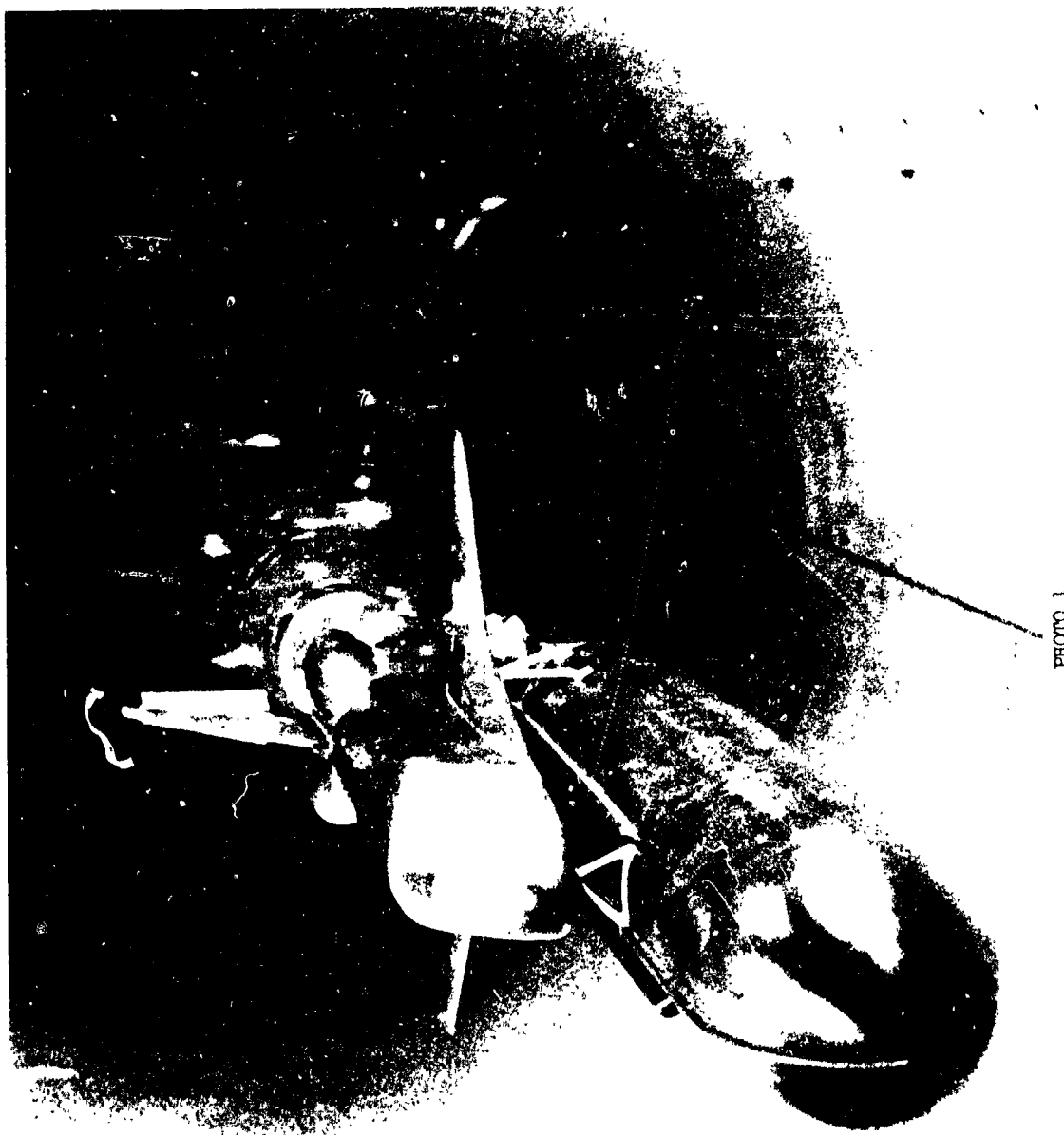


FIG. 6 PAINT STRIPE PATTERN ~ TANK



MODEL 46-1



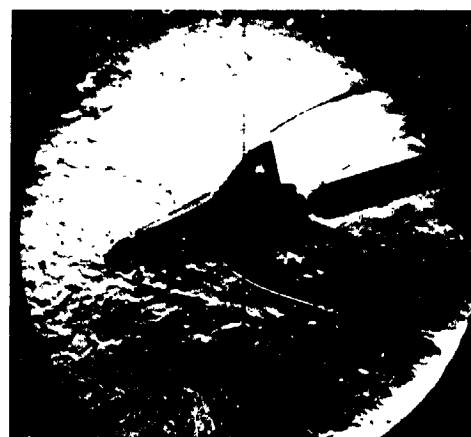
$\phi = 0^\circ$



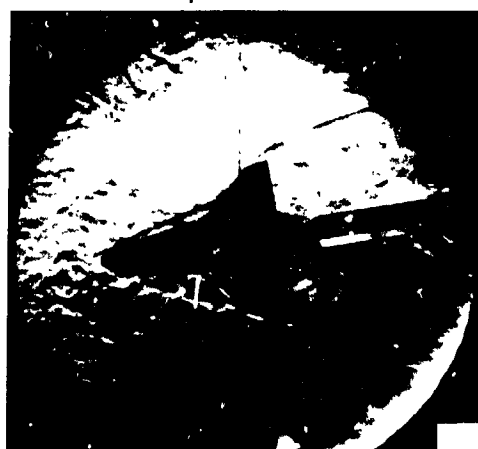
$\phi = 15^\circ$



$\phi = 45^\circ$



$\phi = 60^\circ$



$\phi = 75^\circ$



$\phi = 90^\circ$

PHOTO 2



FIGURE 4-4



$\phi = 0^\circ$



$\phi = 15^\circ$



$\phi = 45^\circ$



$\phi = 60^\circ$



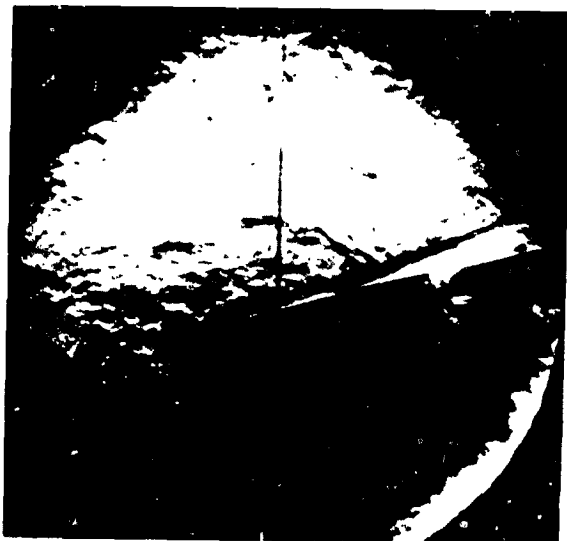
$\phi = 75^\circ$



$\phi = 90^\circ$

PICTURE

PHOTO 4



MODEL 46-2,  $\alpha = 15^\circ$ ,  $\phi = 0^\circ$

PHOTO 5



MODEL 46-2,  $\alpha = 45^\circ$ ,  $\phi = 0^\circ$

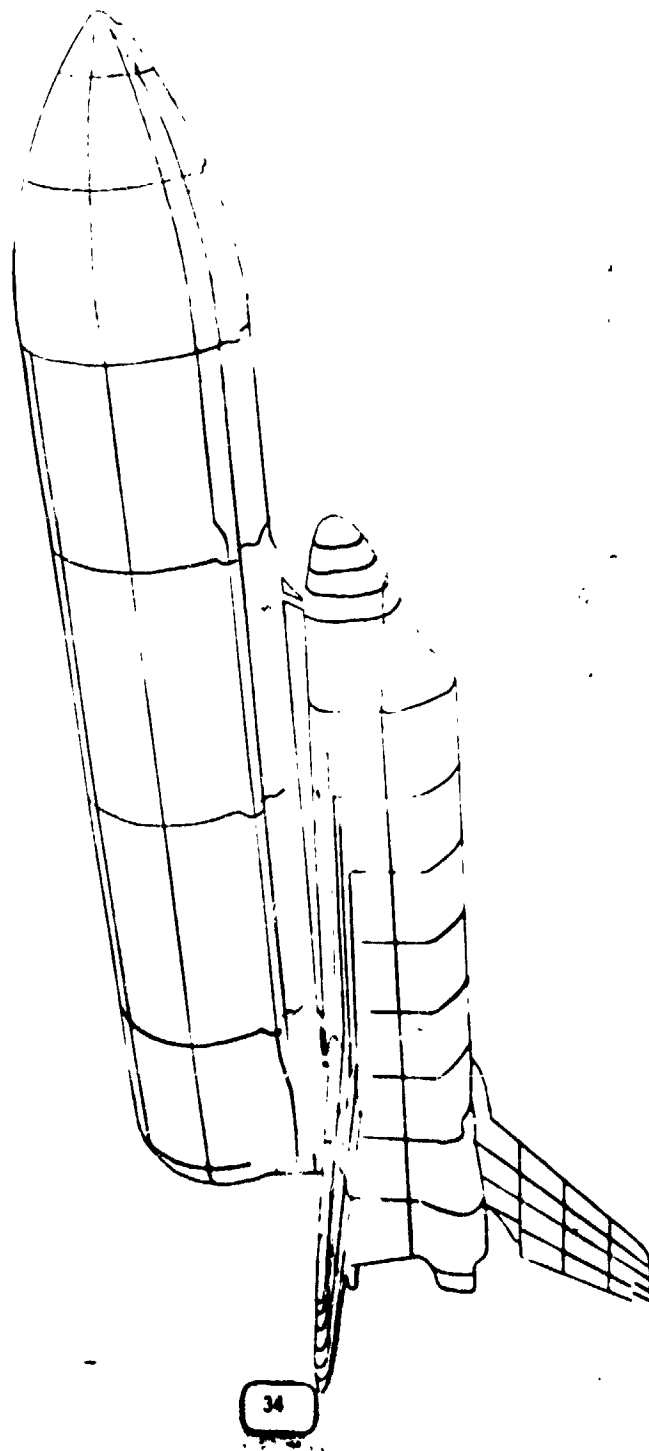
PHOTO 6



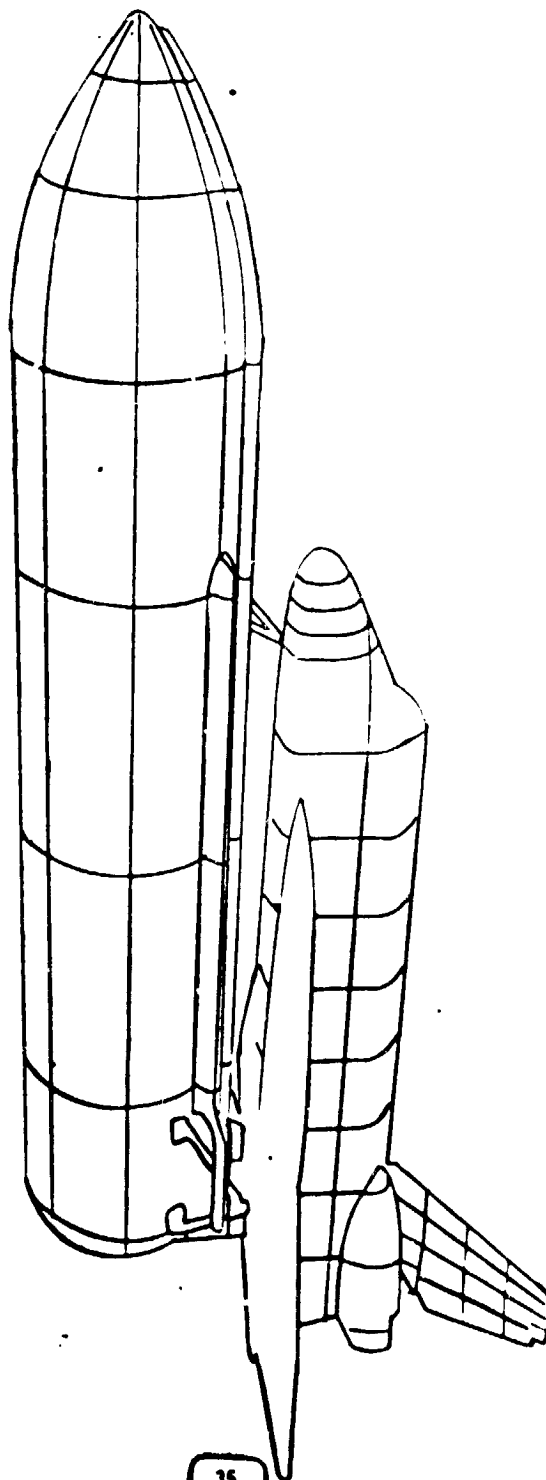
DEL S-22K,  $\alpha = 30^\circ$ ,  $\phi = 90^\circ$

LOWER SIDE (LS)  
ORBITER/TANK INVERTED  
 $\alpha = 0^\circ$

①



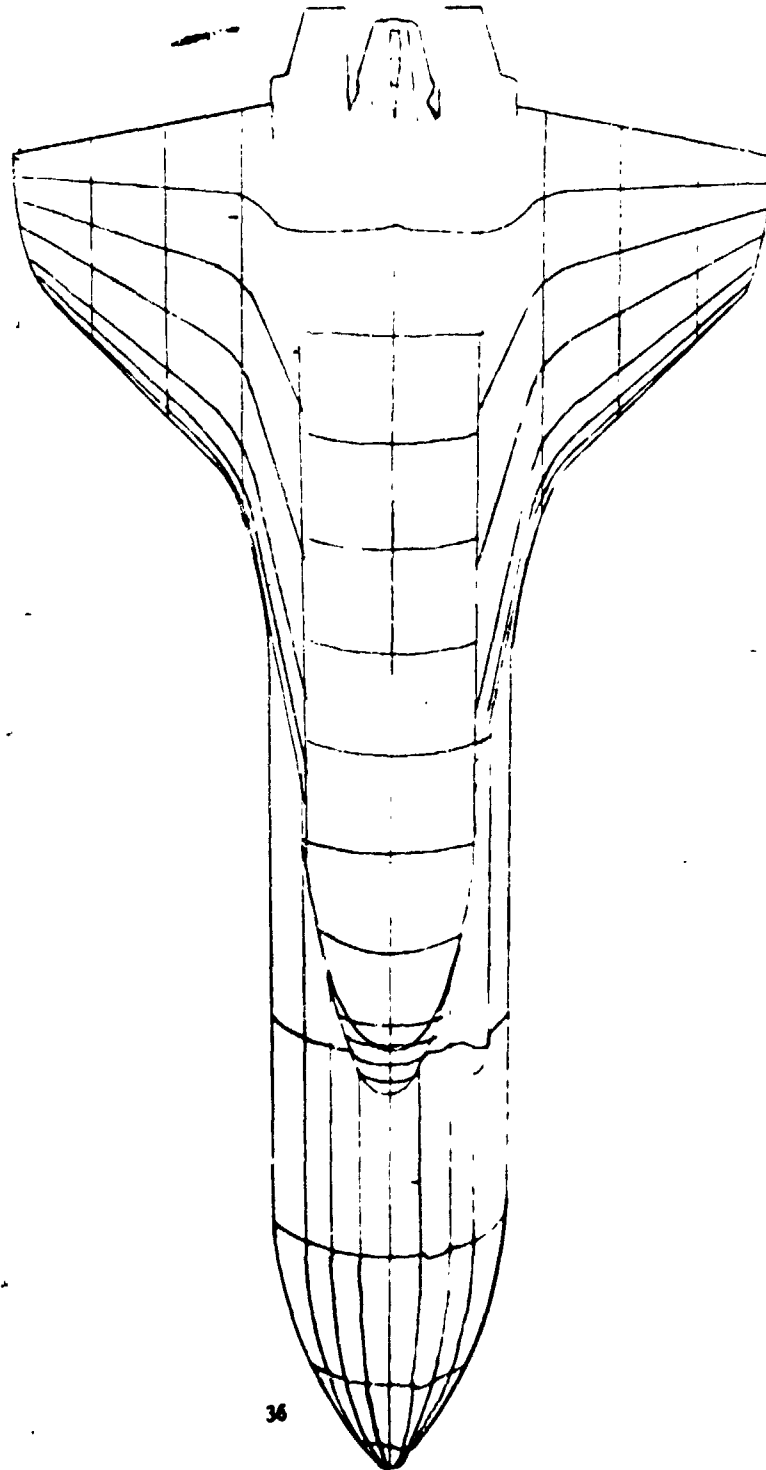
UPPER SIDE (US)  
ORBITER/TANK INVERTED  
 $\alpha = 0^\circ$   
193°  $\phi_T$  @  $0^\circ$



7.11

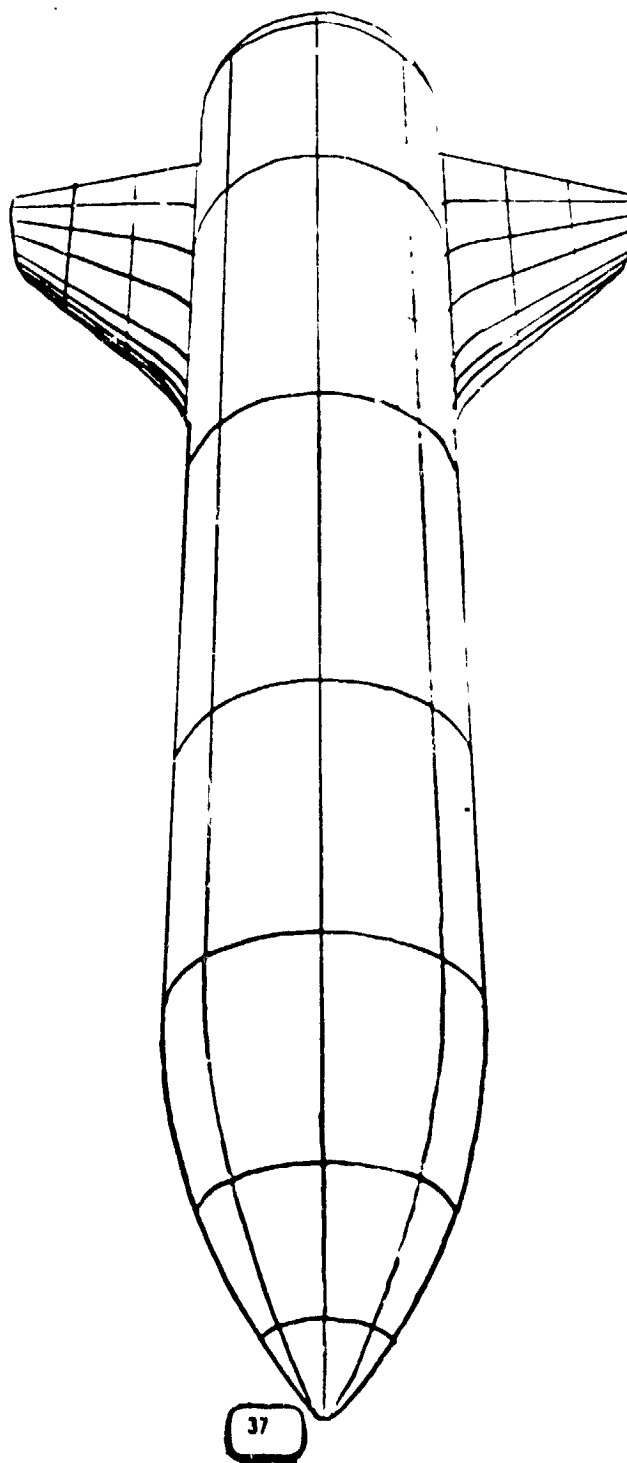
DT @ 0°

BOTTOM (B)  
ORBITER/TANK INVERTED  
 $\alpha = 0^\circ$



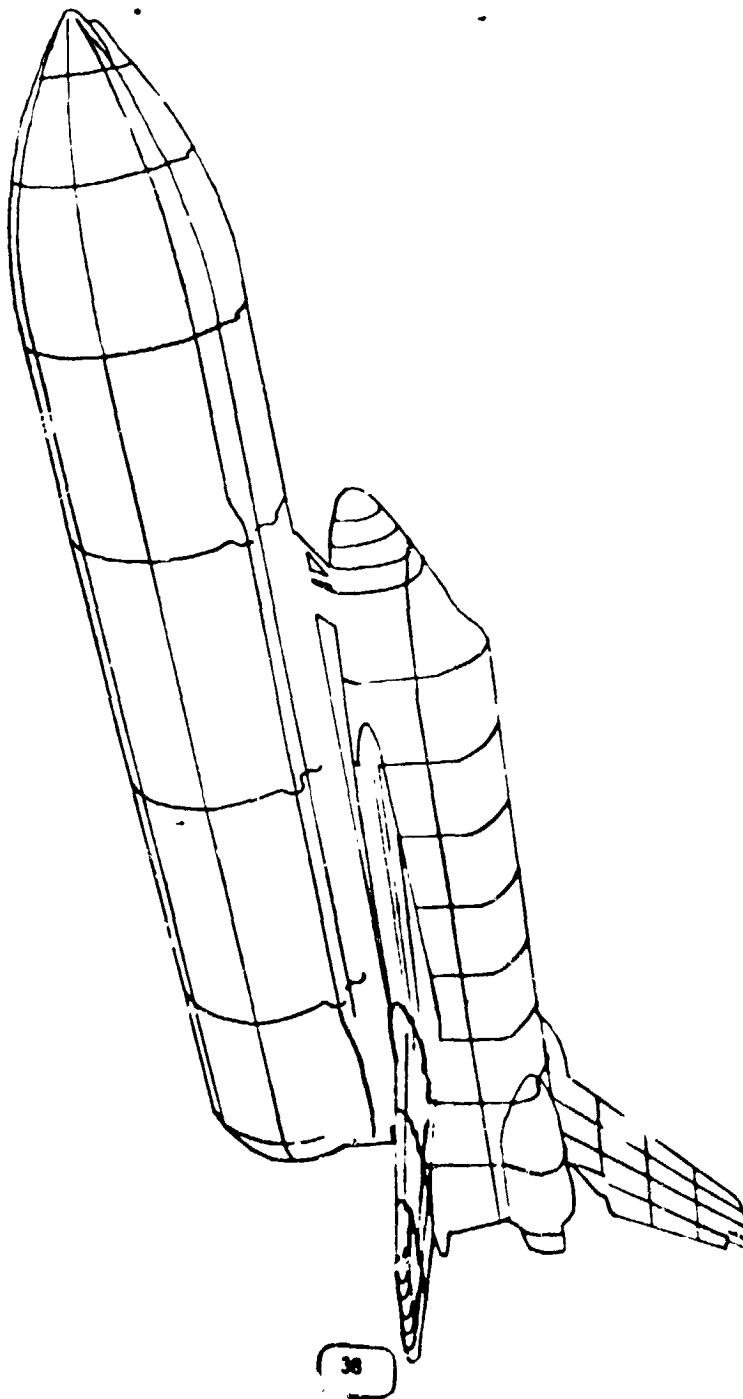
8319  $\phi T 0^\circ$

TOP (T)  
ORBITER/TANK INVERTED  
 $\alpha 3^\circ$



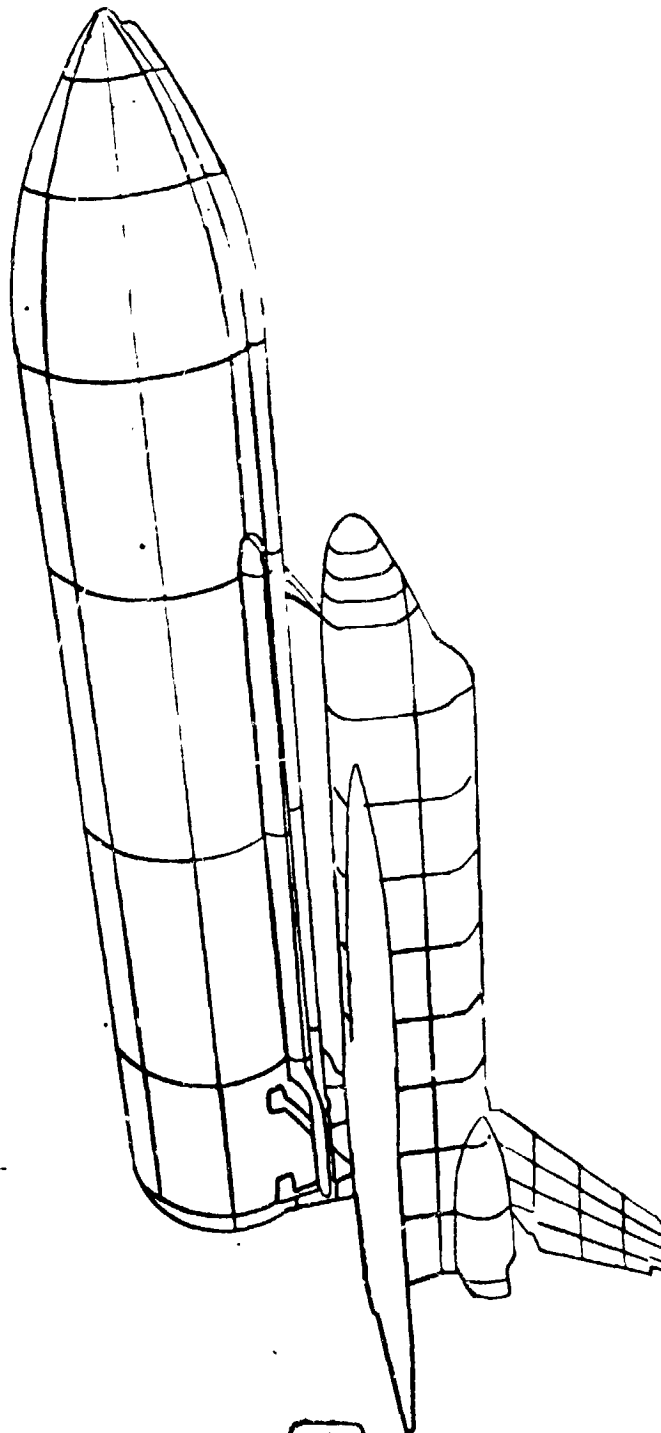
7260  
01-5  
②

LOWER SIDE (LS)  
ORBITER/TANK INVERTED  
 $\alpha = -5^\circ$



1930 BT @ -5°

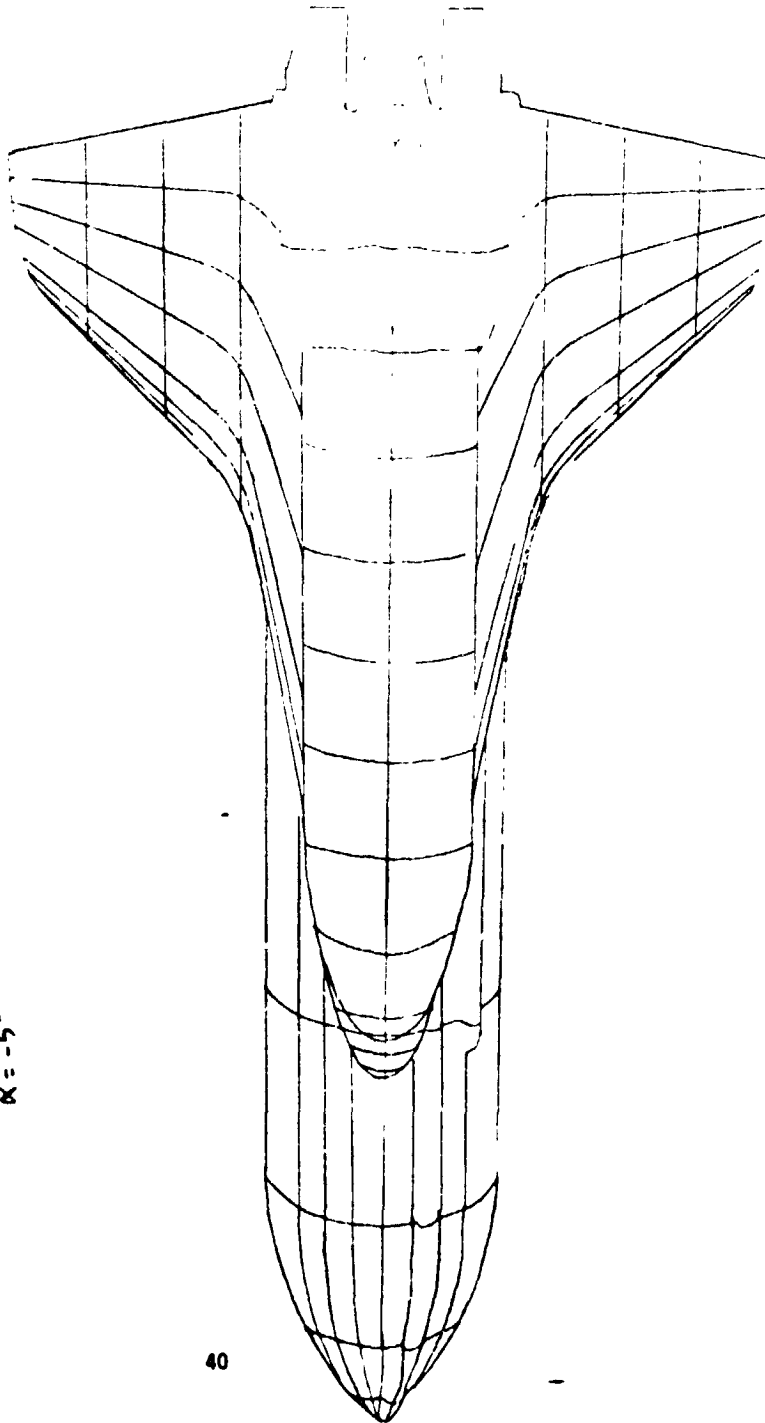
UPPER SIDE (US)  
ORBITER/TANK INVERTED  
 $\alpha = -5^\circ$





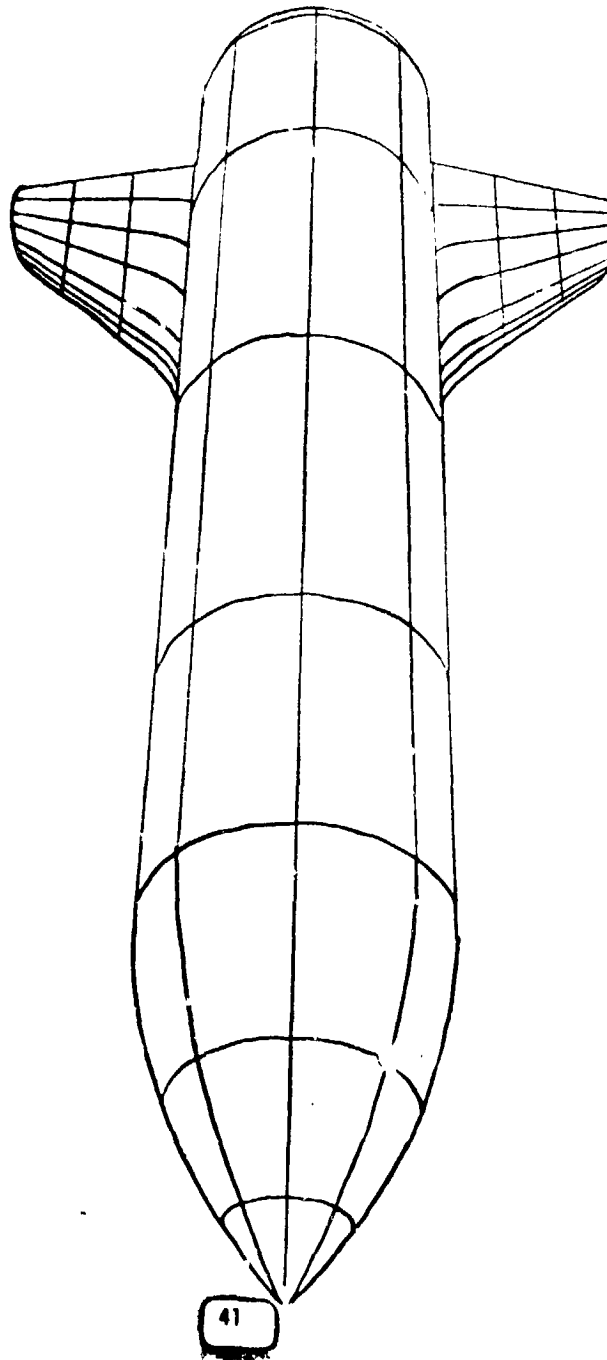
8550 C7 -6

BOTTOM (S)  
ORBITER/TANK INVERTED  
 $K = -5^\circ$



8319  $\phi T, -5^\circ$

TOP (T)  
ORBITER/TANK INVERTED  
 $\alpha = -5^\circ$



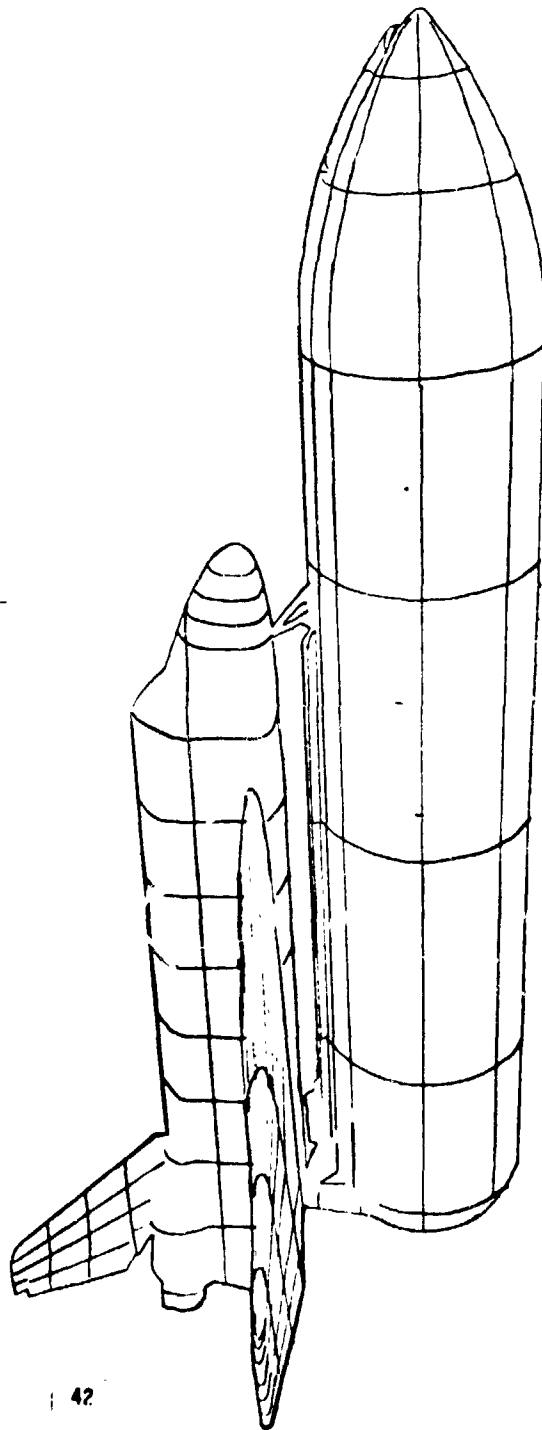
072 0°

7360

③

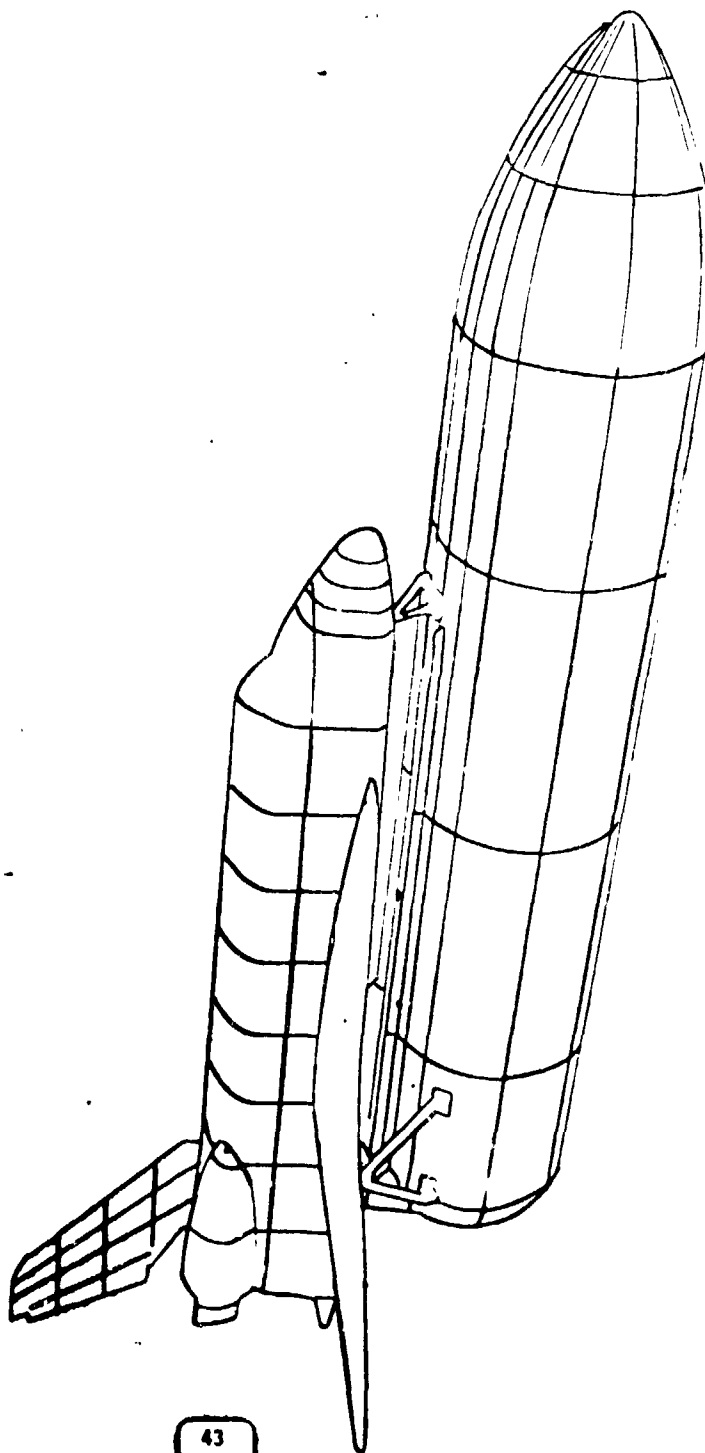
LOWER SIDE (LS)  
ORBITER/TANK UPRIGHT

$\alpha = 0^\circ$



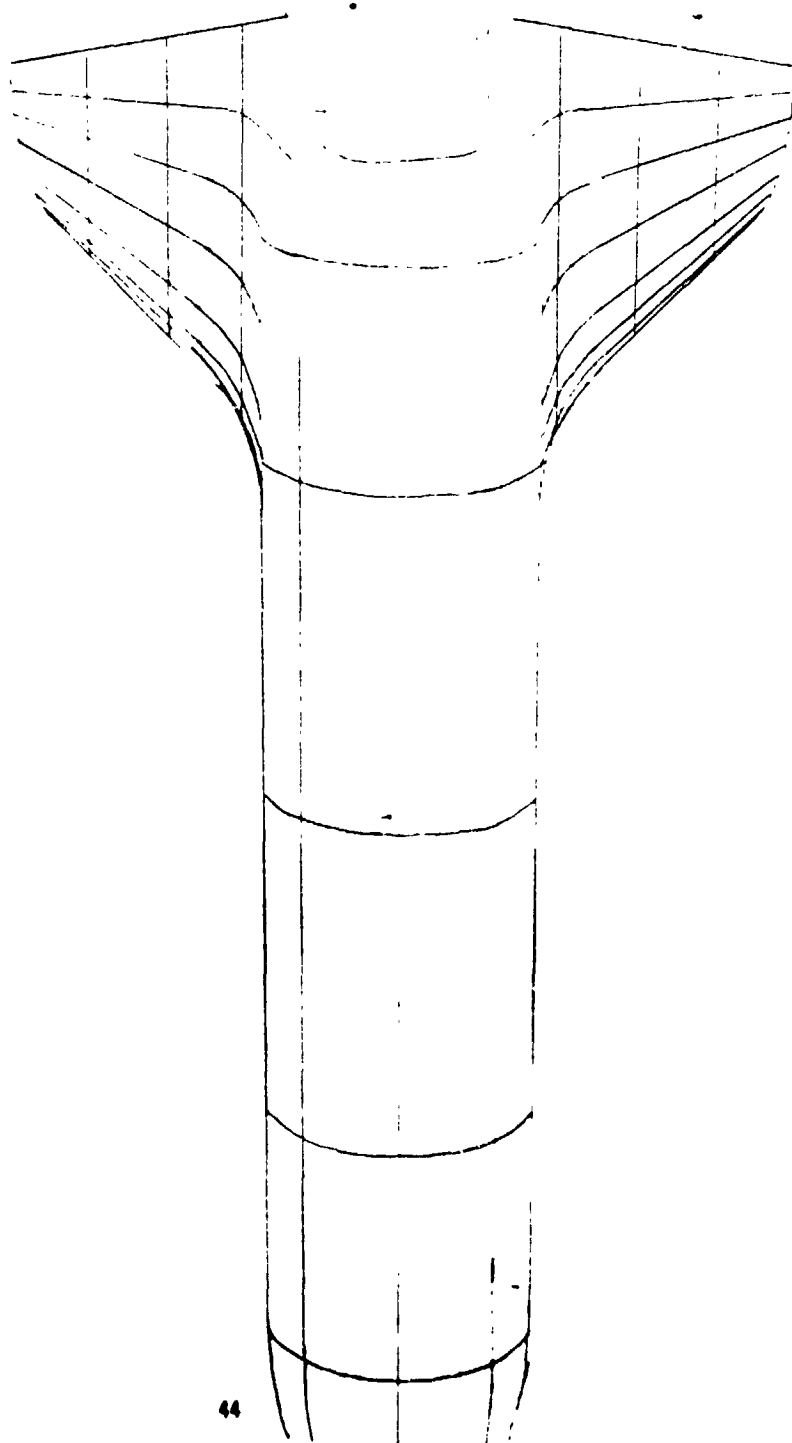
1930  $\phi T_a @ 0^\circ$

UPPER SIDE (US)  
ORBITER/TANK UPRIGHT  
 $\alpha = 0^\circ$



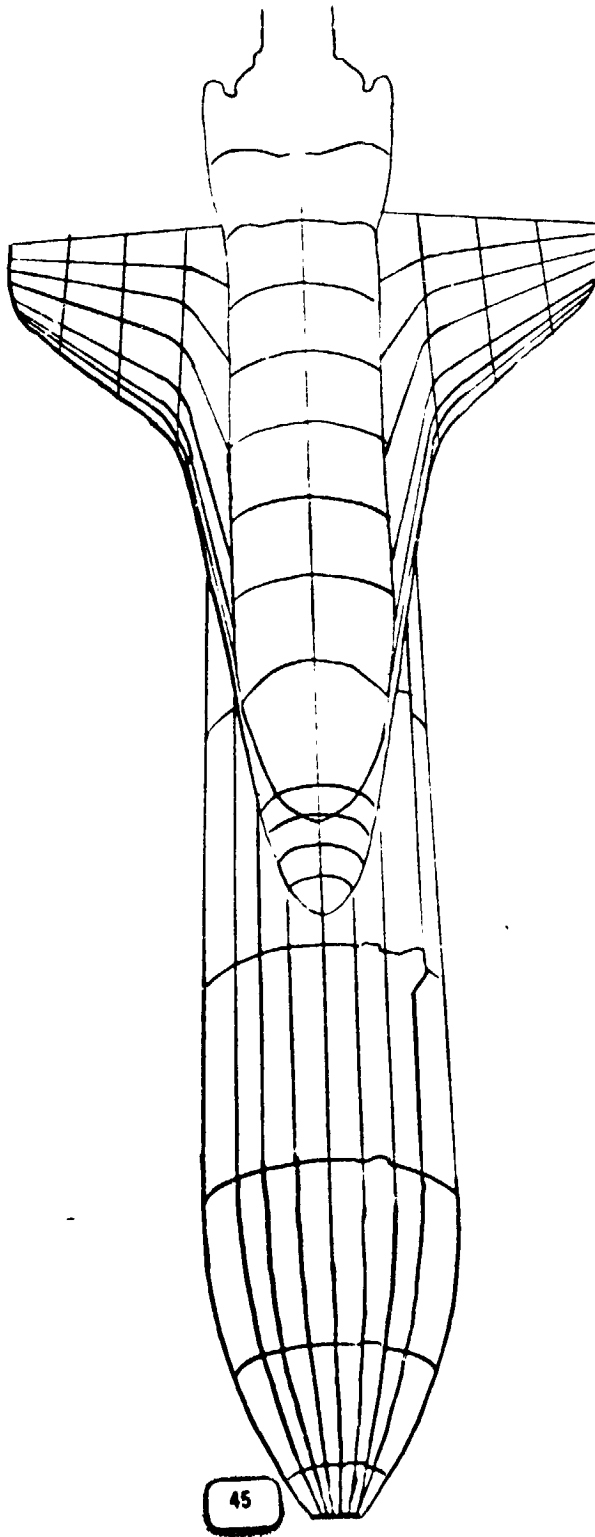
8386

BOTTOM (B)  
ORBITER/TANK UP-RIGHT  
 $\alpha = 0^\circ$



8319 0Te  $\alpha = 0^\circ$

TOP (T)  
ORBITER/TAKE UPRIGHT  
 $\alpha = 0^\circ$

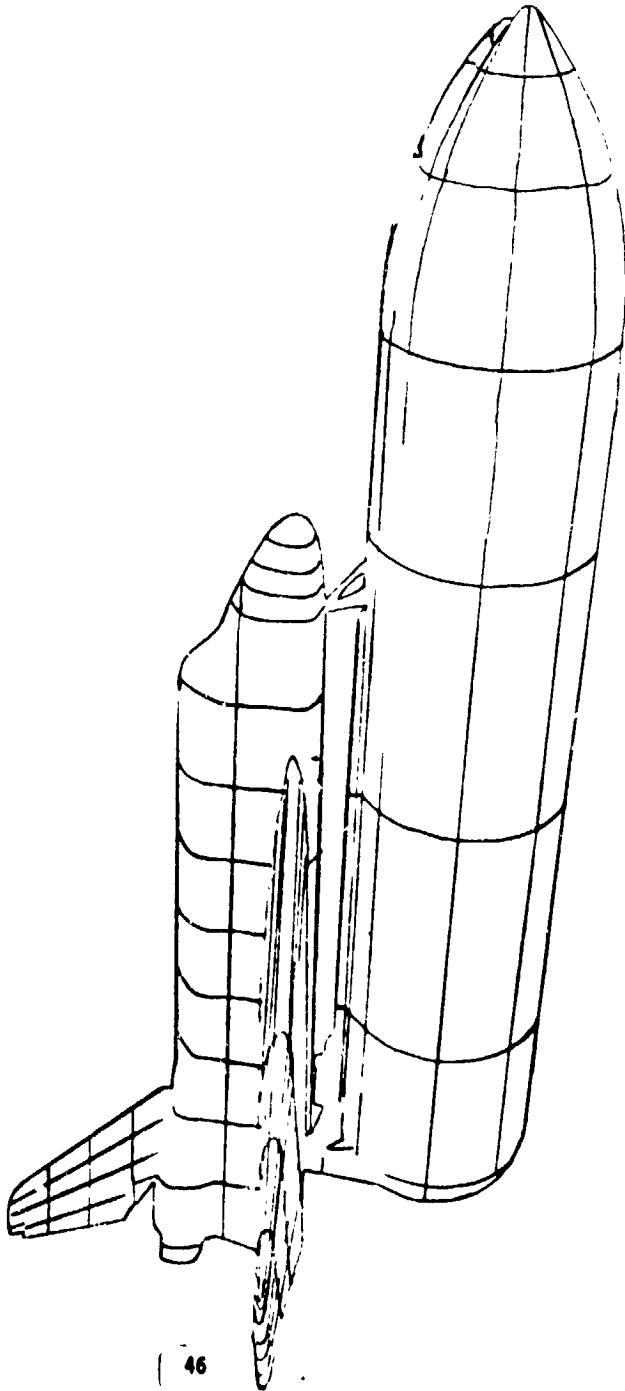


CR  
Q -5°

7260

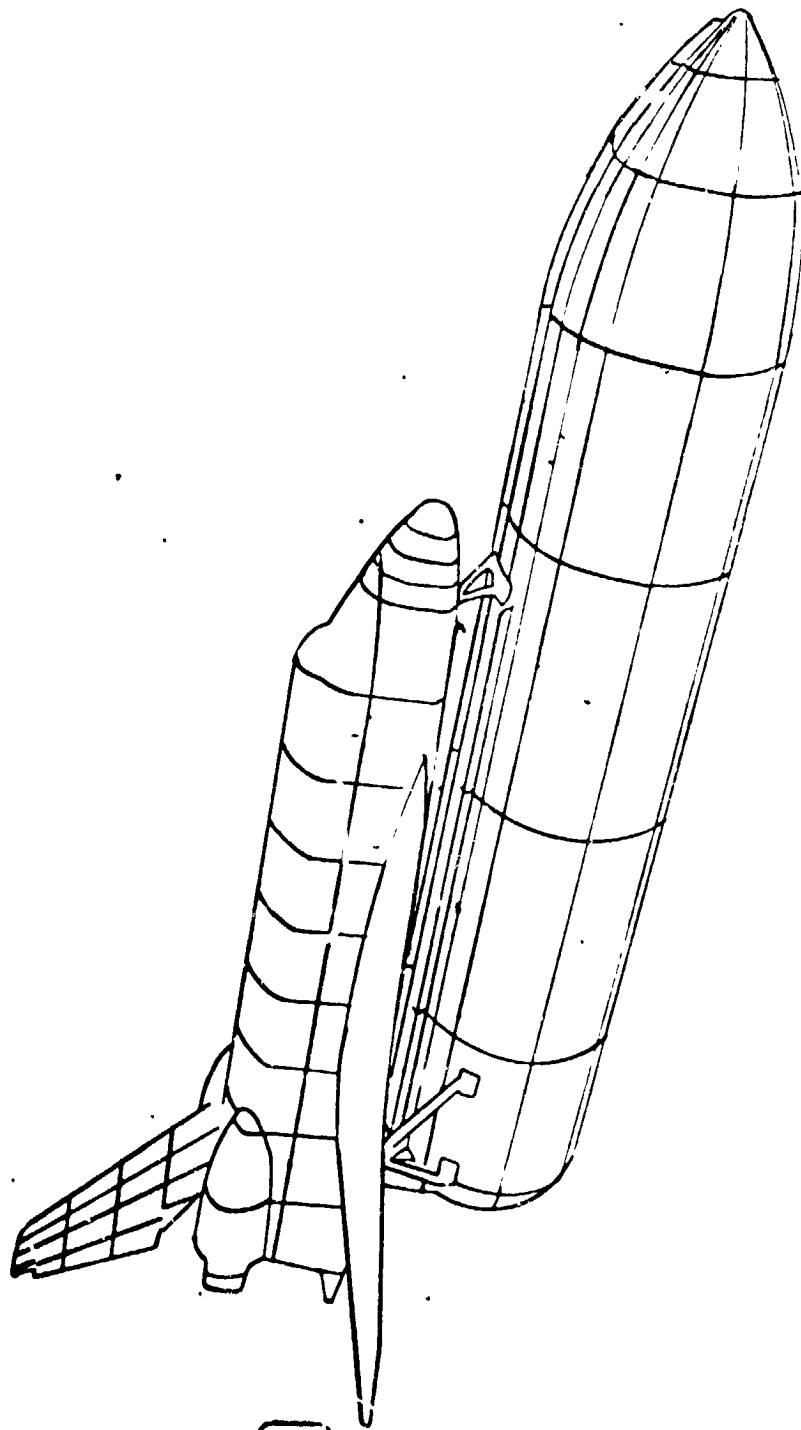
(A)

LOWER SIDE (LS)  
ORBITER/TANK UPRIGHT  
 $\alpha = -5^\circ$



1930 OTR @ -5°

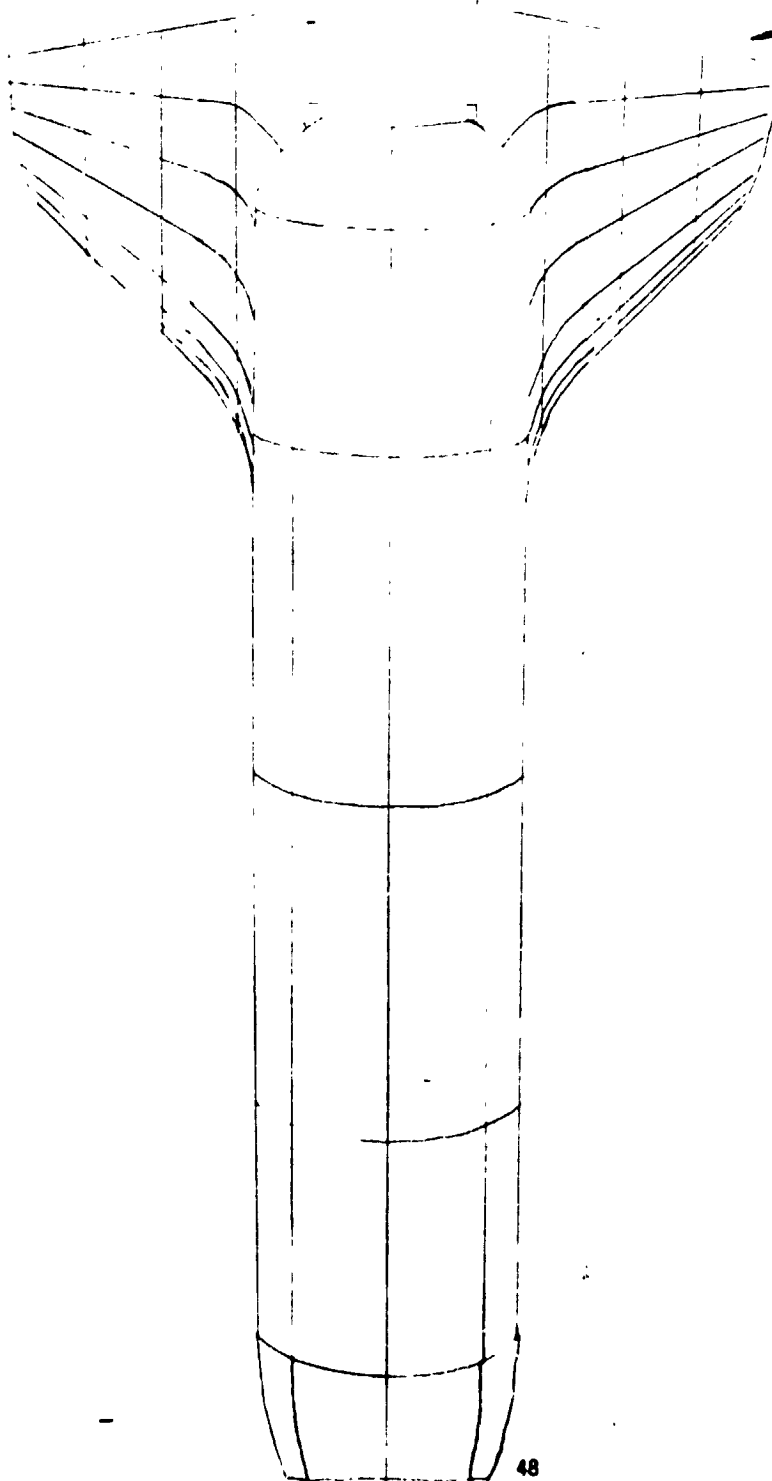
UPPER SIDE (US)  
ORBITER/TANK UPRIGHT  
 $\alpha = -5^\circ$





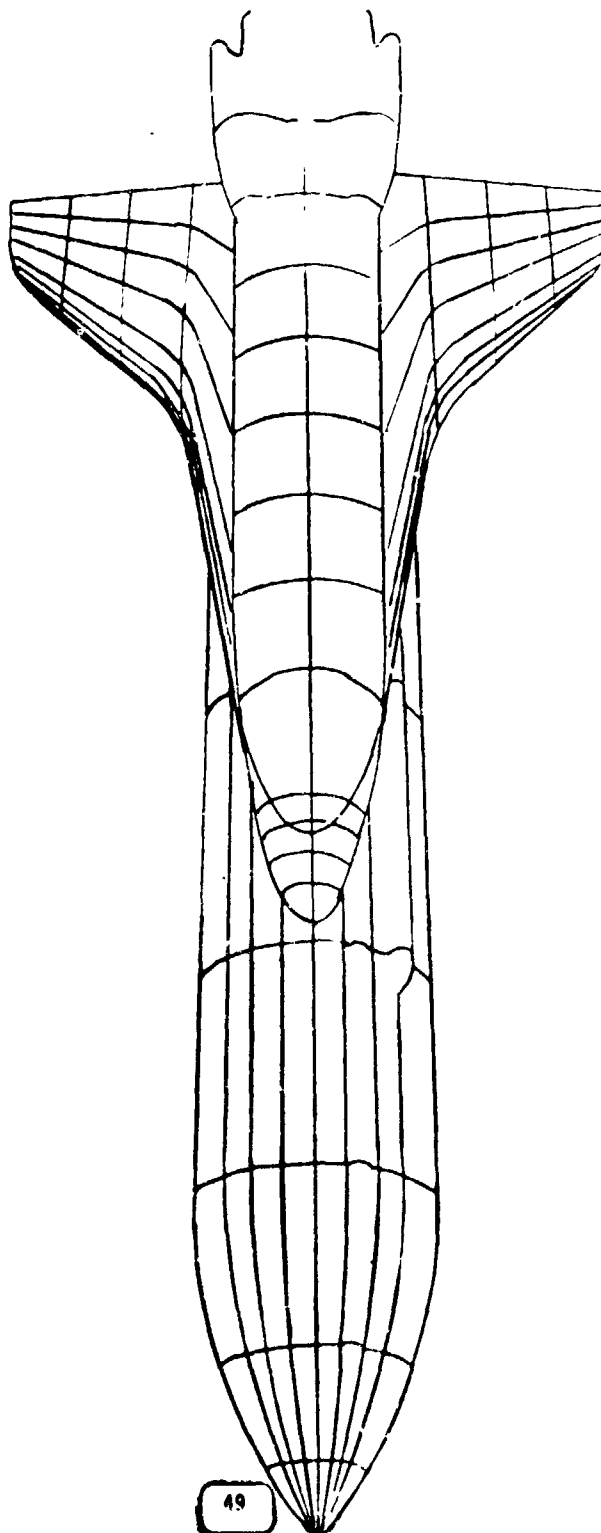
200, 01, 2'

BOTTOM (B)  
ORBITER/TAIL UPRIGHT  
40-5°



8319 OTR -5°

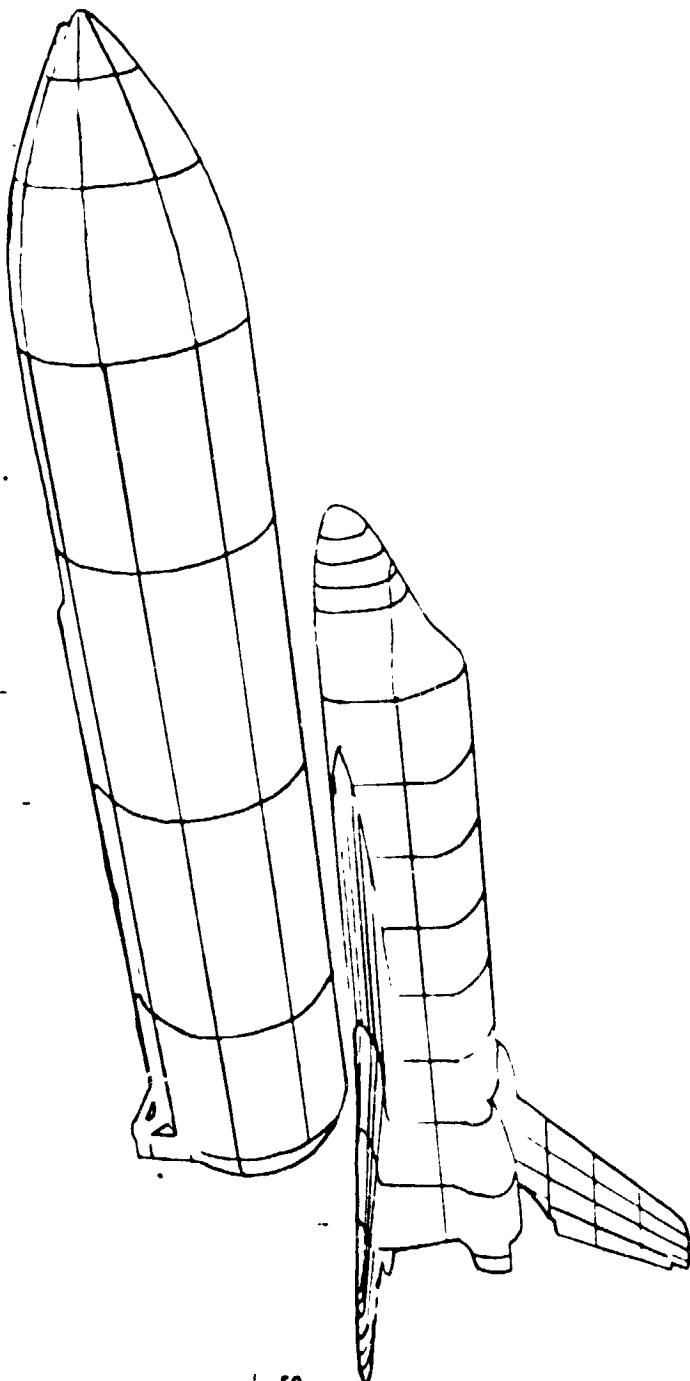
TOP ( )  
O.DETER/TAX UPRIGHT  
 $\alpha = -5^\circ$



7260 012  
00°

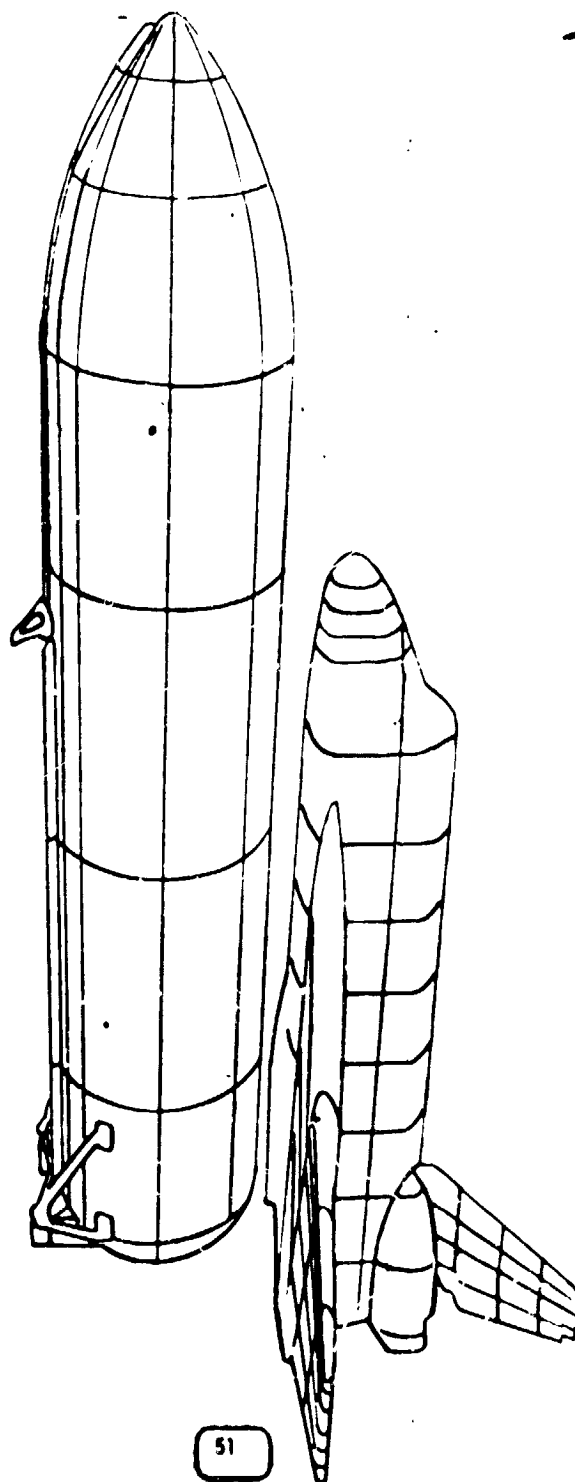
(5)

LOWER SIDE (LS)  
ORBITER/TANK - TANK UPRIGHT  
 $\alpha = 0^\circ$



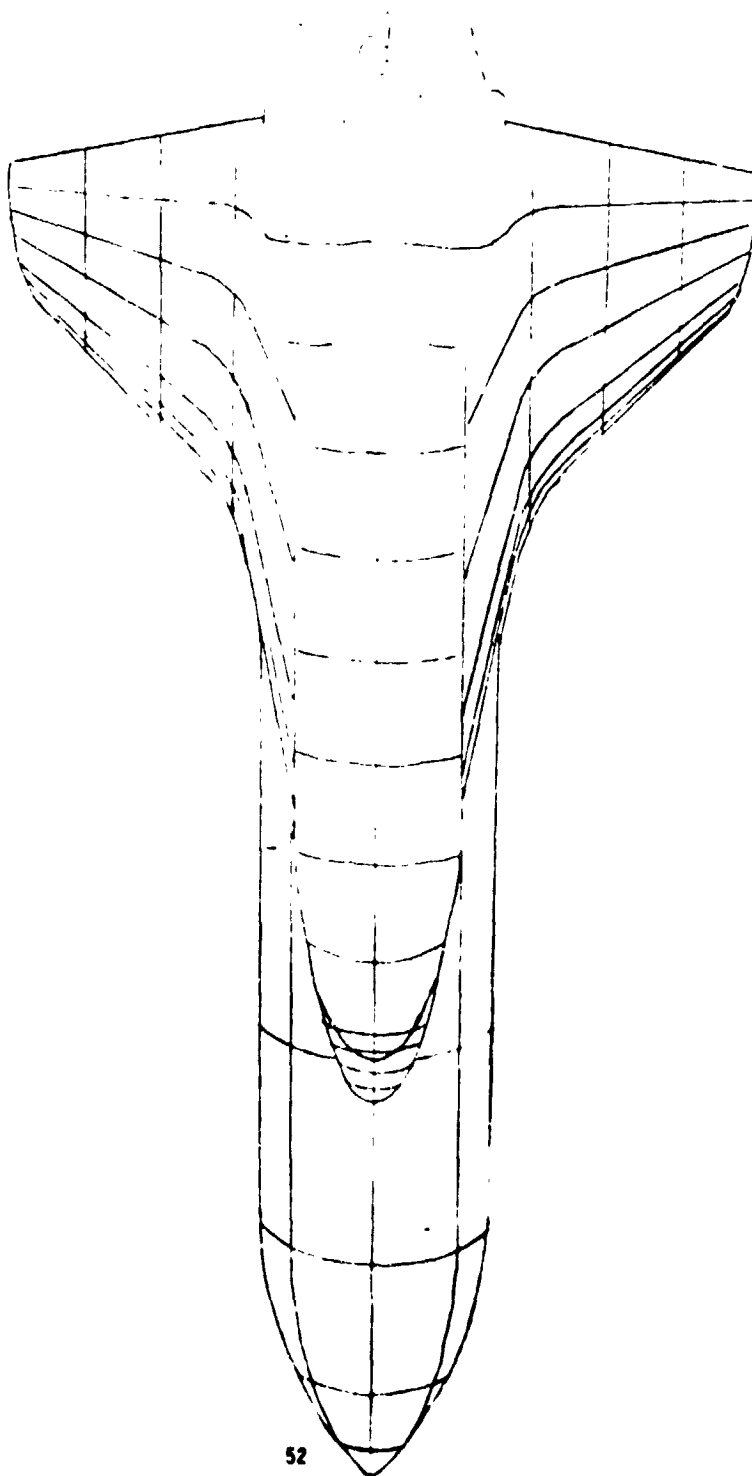
193°  $\phi$  Tra 0°

UPPER SIDE (US)  
ORBITER/TANK - TANK UPRIGHT  
450°



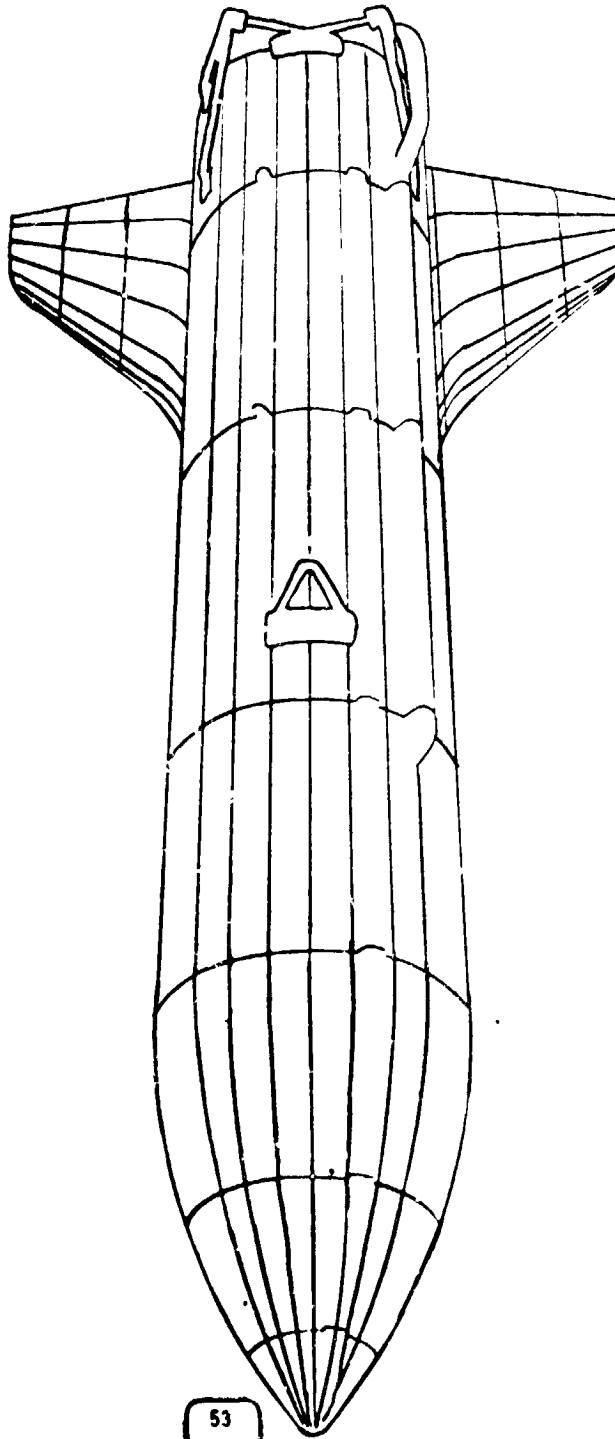
2' 4" 5'

BOTTOM (B)  
ORBITER/TANK - TANK UPRIGHT  
 $\alpha = 0^\circ$



8319  $\phi T_{12} 0^\circ$

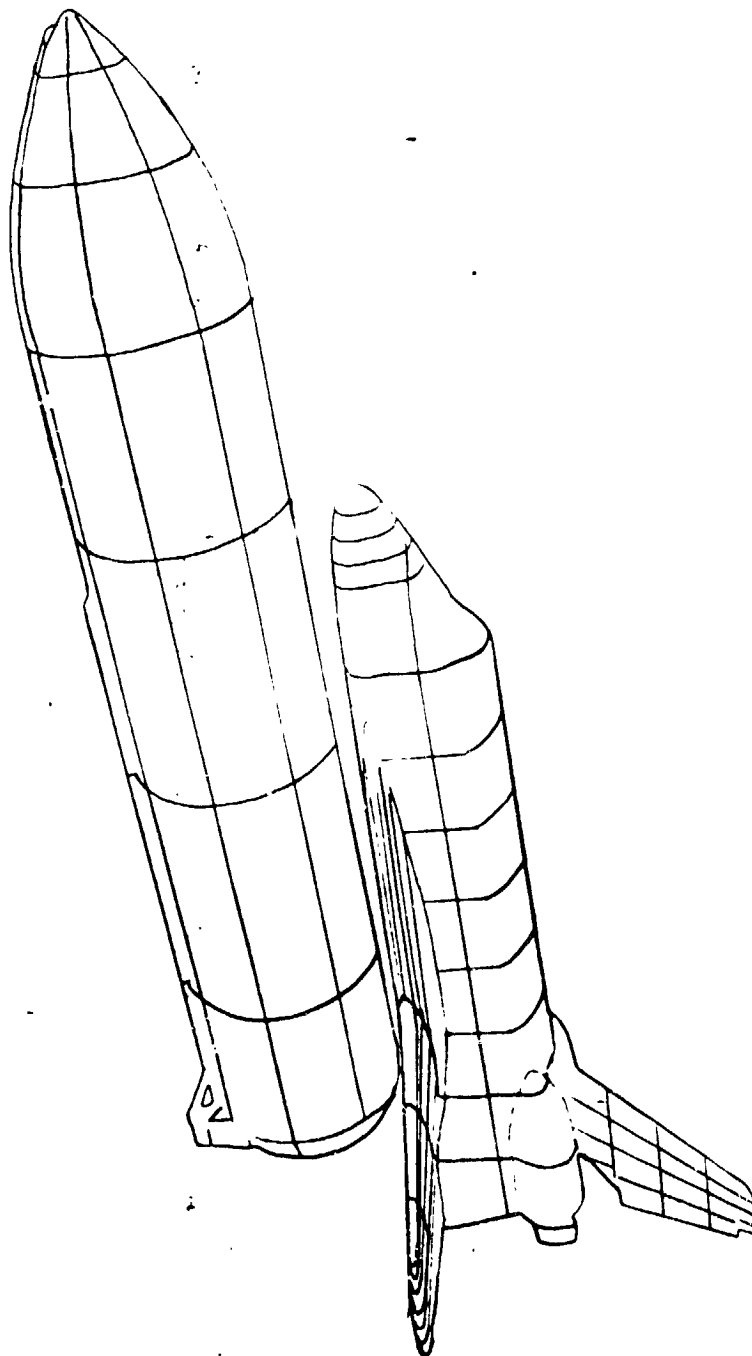
TOP (T)  
ORBITER/TANK - TANK UPRIGHT  
 $\alpha \pm 0^\circ$



7260 CTR @ 5°

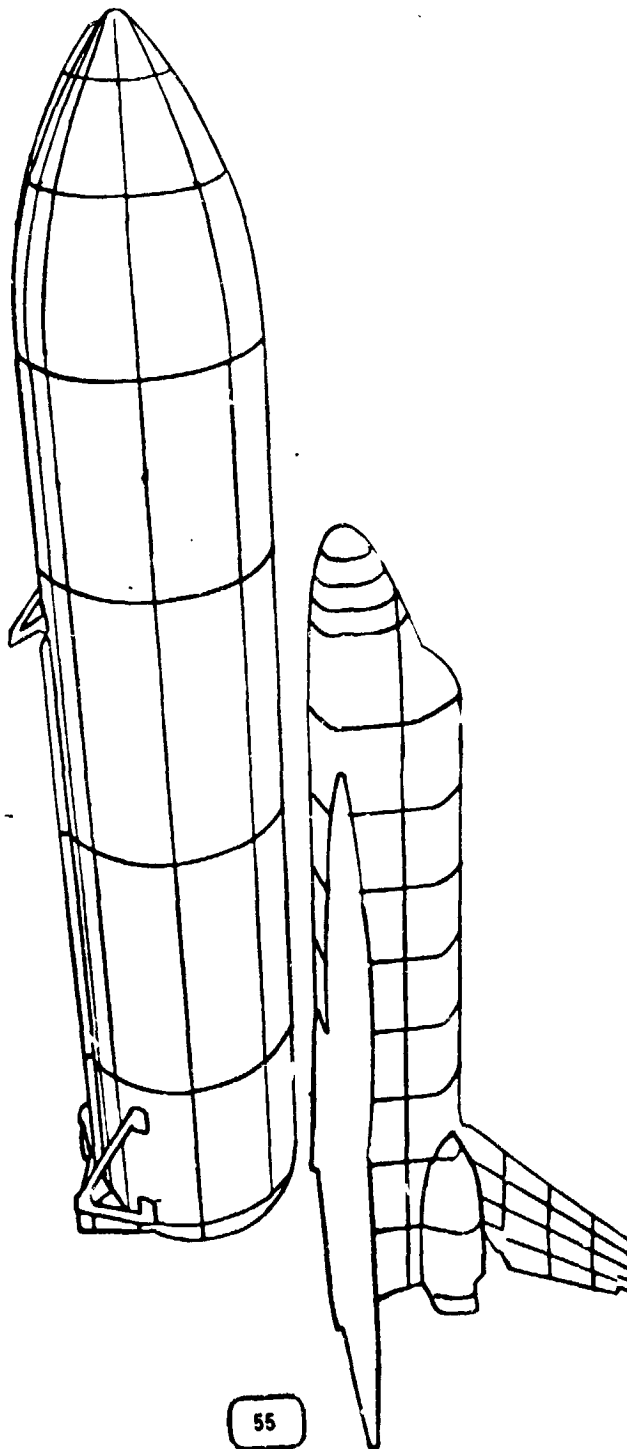
(6)

LOWER SIDE (LS)  
ORBITER/TANK-TANK UPRIGHT  
 $\alpha = -5^\circ$



1930  
OTR @ -5°

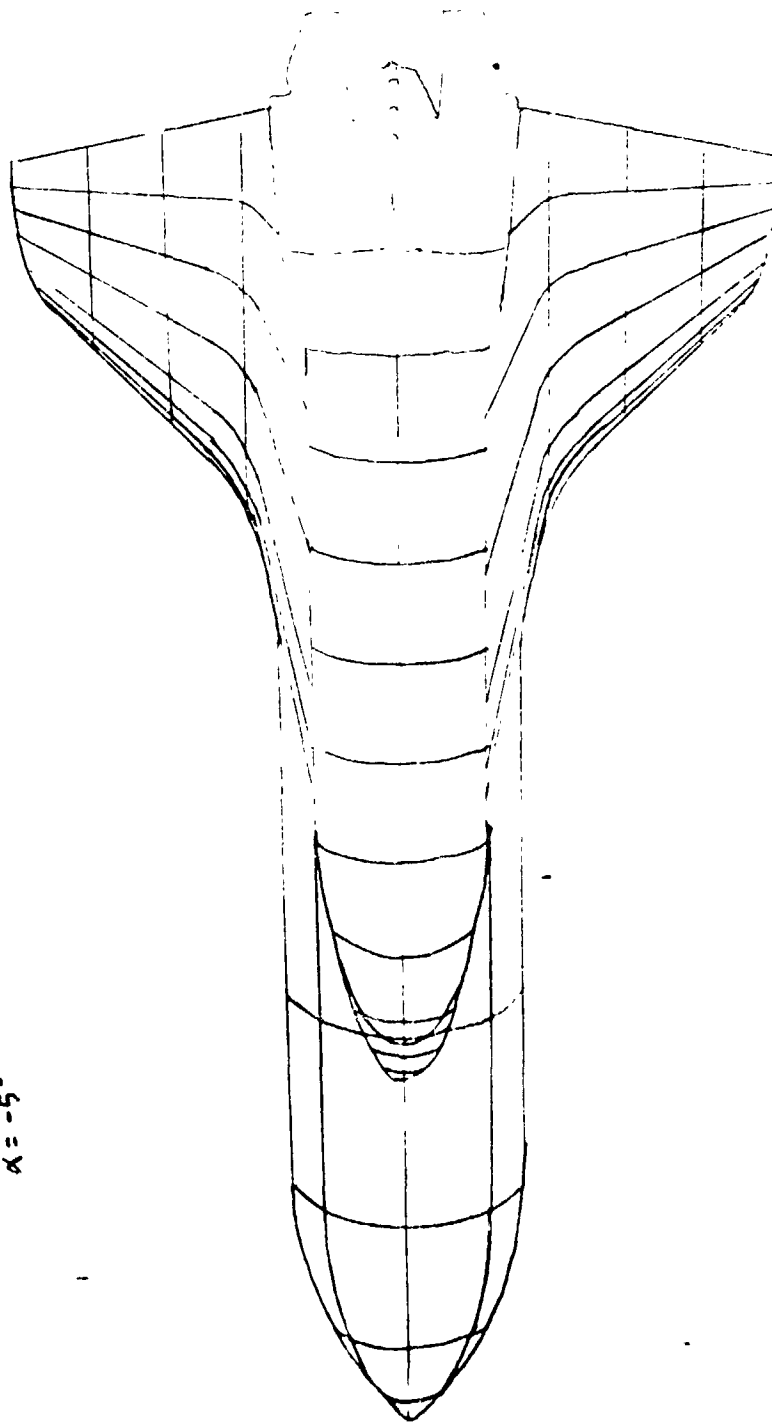
UPPER SIDE (US)  
ORBITER/TANK - TANK UPRIGHT  
α = -5°





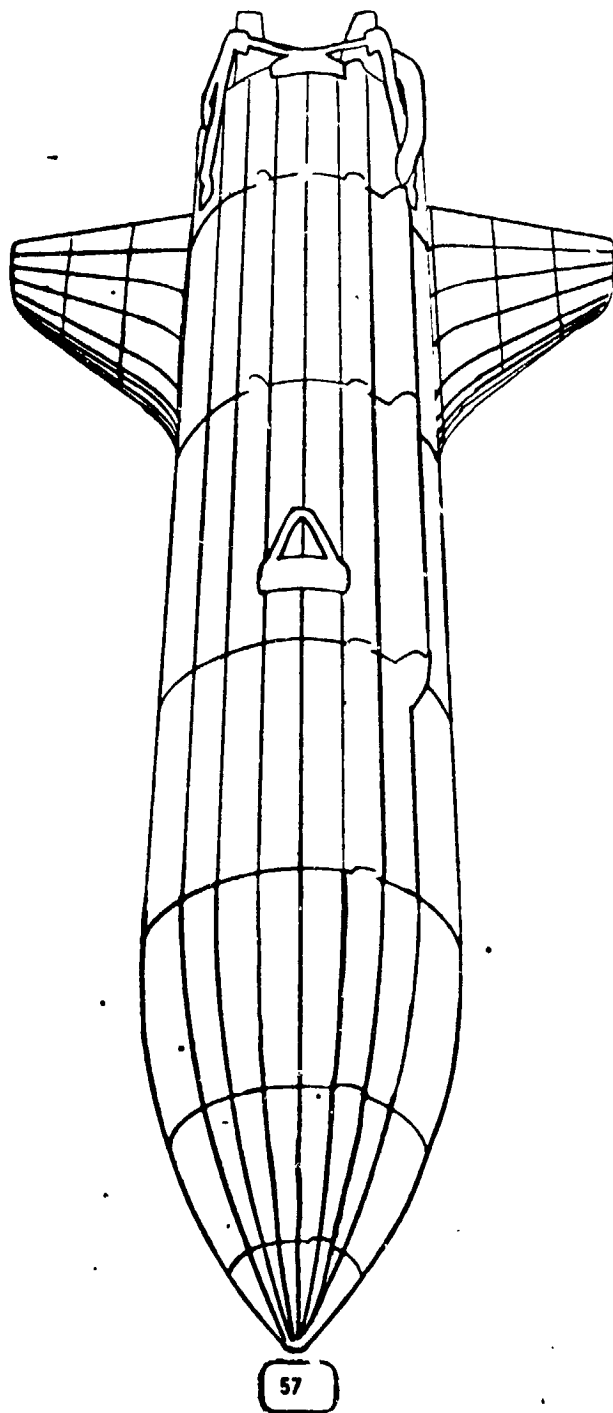
5.00 0.12 -5°

BOTTOM (B)  
ORBITER/TANK -TANK UPRIGHT  
 $\alpha = -5^\circ$



4319  $\phi_{T12} - 5^\circ$

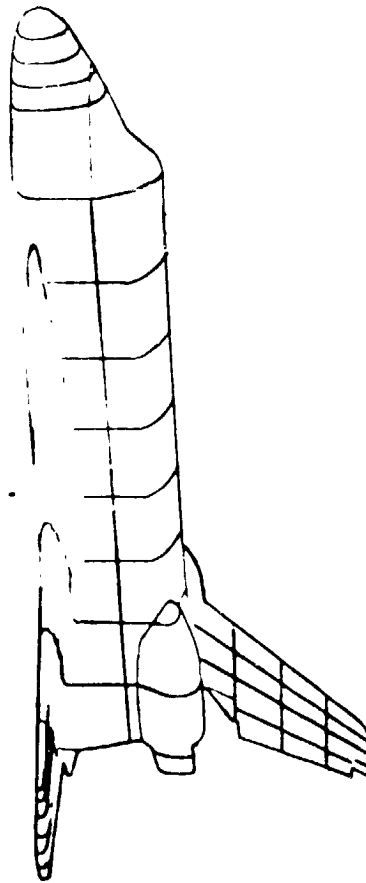
TOP (T)  
ORBITER/TANK - TANK UPRIGHT  
 $\alpha = -5^\circ$



7160 0 @ 0°

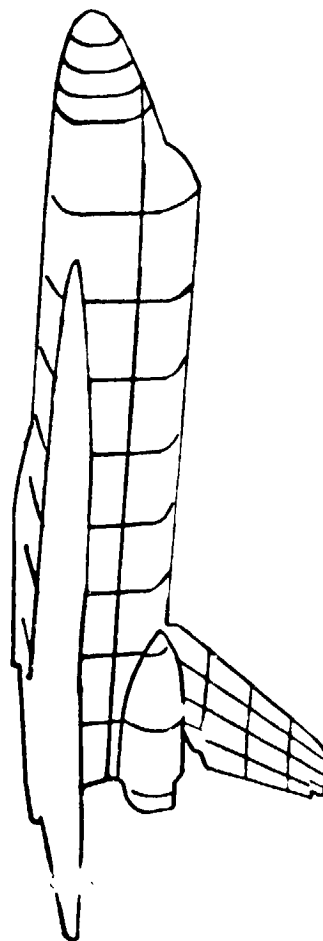
⑦

Lower Side (LS)  
 DEBITER ALONE  
 $\alpha = 0^\circ$

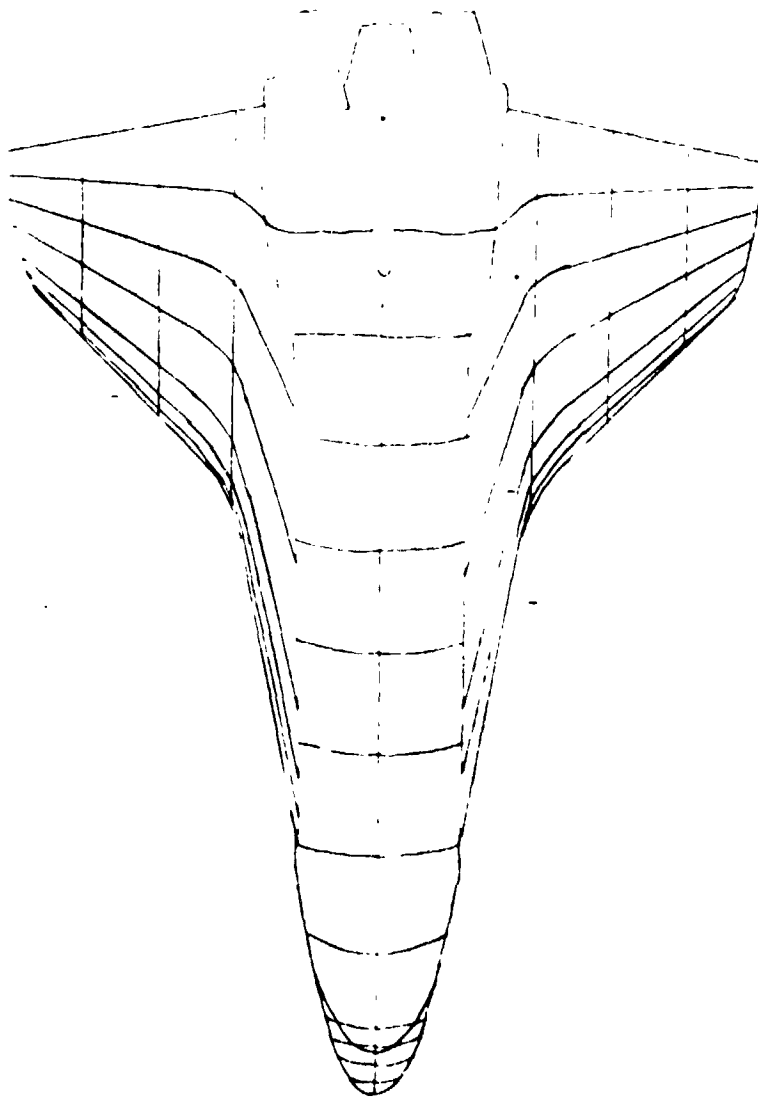


7930  $\phi$  00°

UPPER SIDE (US)  
ORBITER ALONE,  
 $\alpha = 0^\circ$

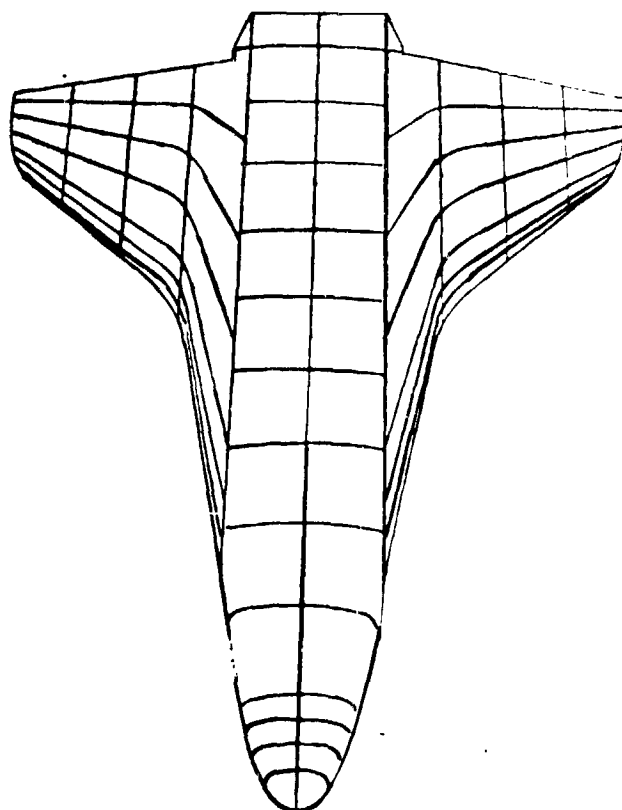


Bottom (B)  
Orbiter Alone  
 $\alpha = 0^\circ$



9319 0 00

Top (T)  
Desire Name  
 $\alpha = 0^\circ$

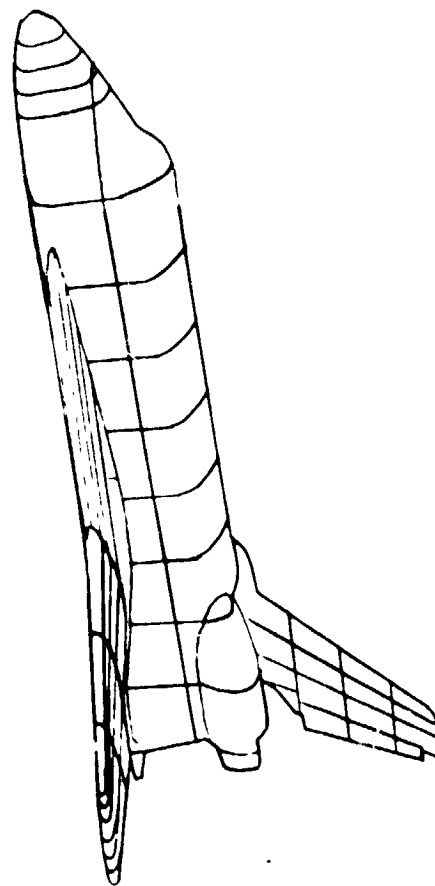


1260

0 @ -5°

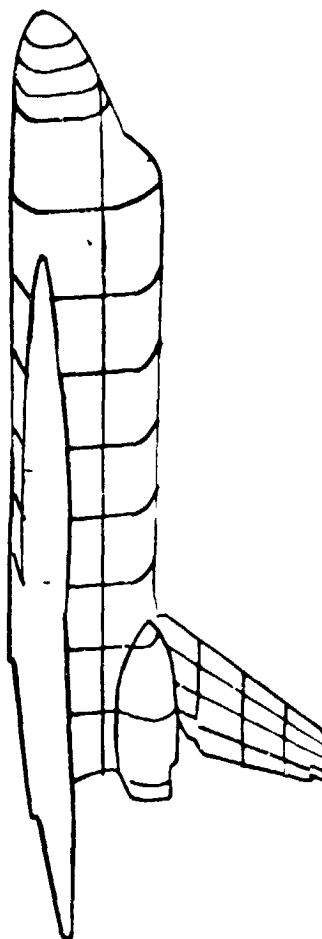
(8)

LOWER SIDE (LS)  
ORBITER ALONE  
 $\alpha = -5^\circ$



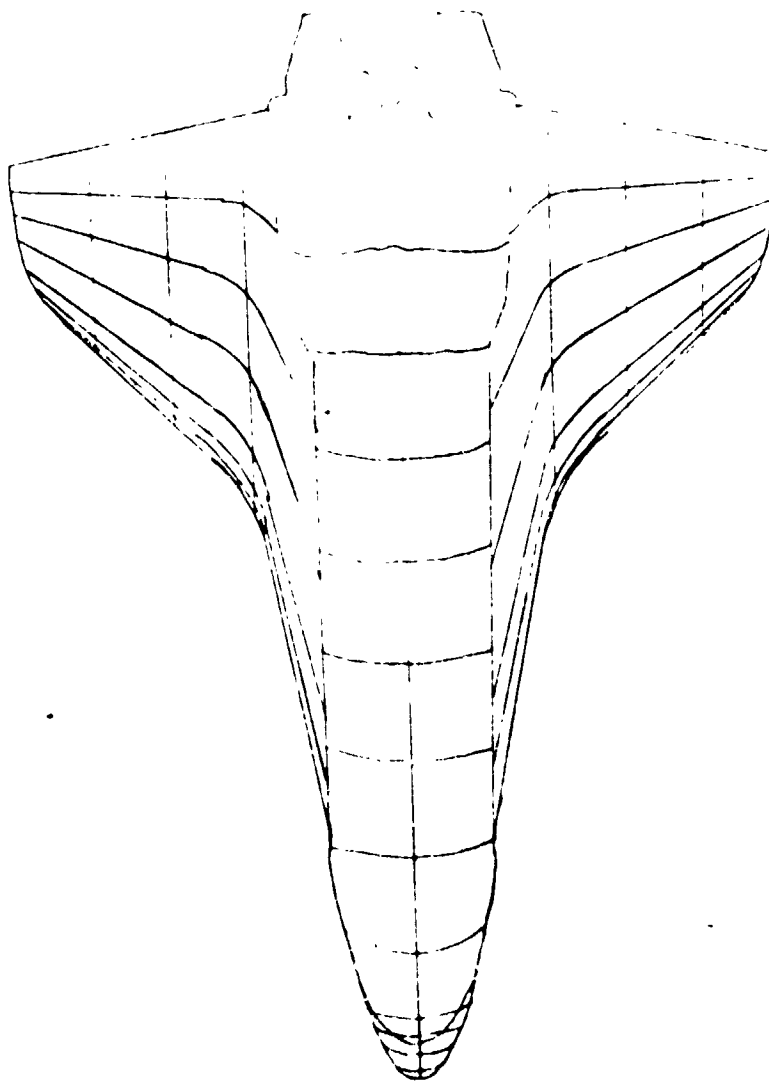
7930  $\phi$  @-5°

Upper Side (US)  
ORBITER ALONG  
 $\alpha = -5^\circ$



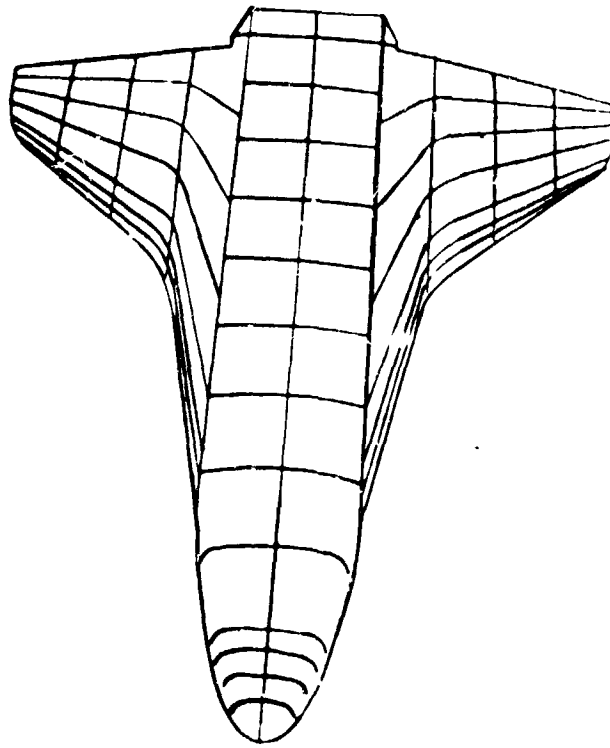


BOTTOM (B)  
ORBITER ALONE  
 $\alpha = -5^\circ$



8214 0 @-5°

Top (T)  
Oscillate Along  
 $\alpha = -5^\circ$



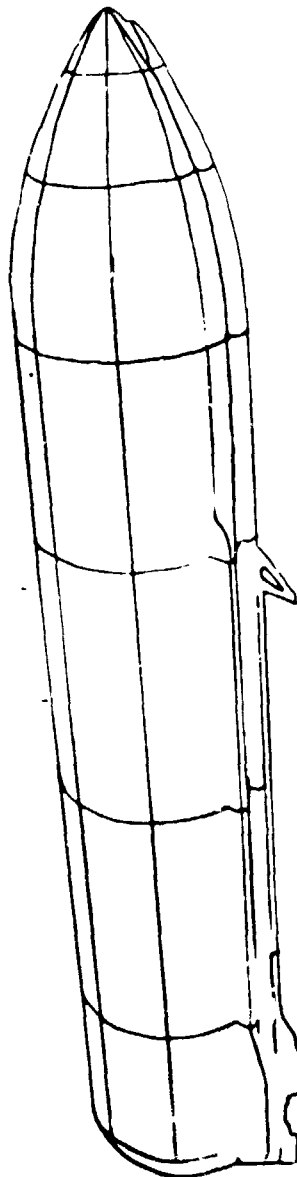
7260 T 0°

(9)

Lower Side (15)

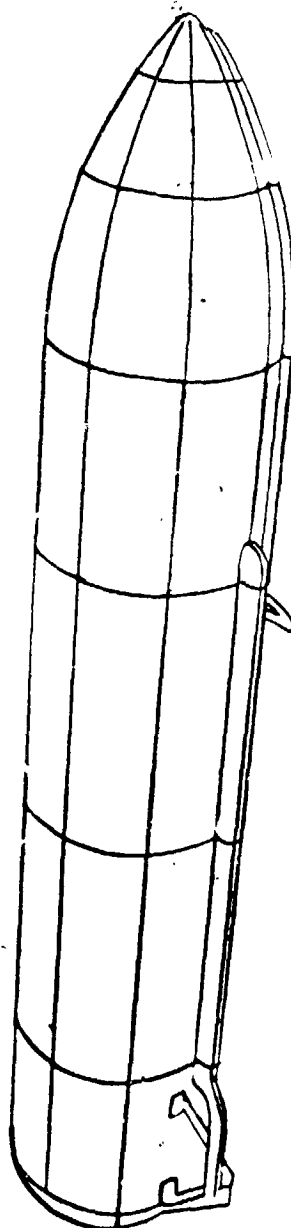
True Alone

$\alpha = 0^\circ$



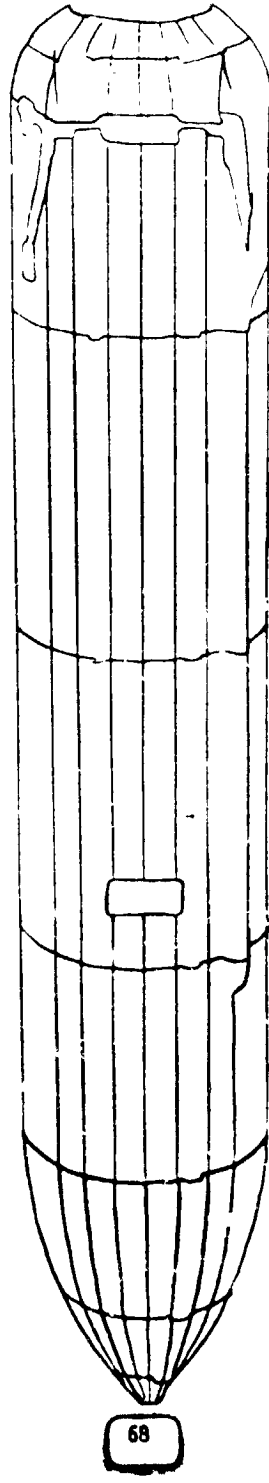
1930 T 00°

UPPER SIDE (US)  
TANK ALONE  
 $\alpha = 10^\circ$



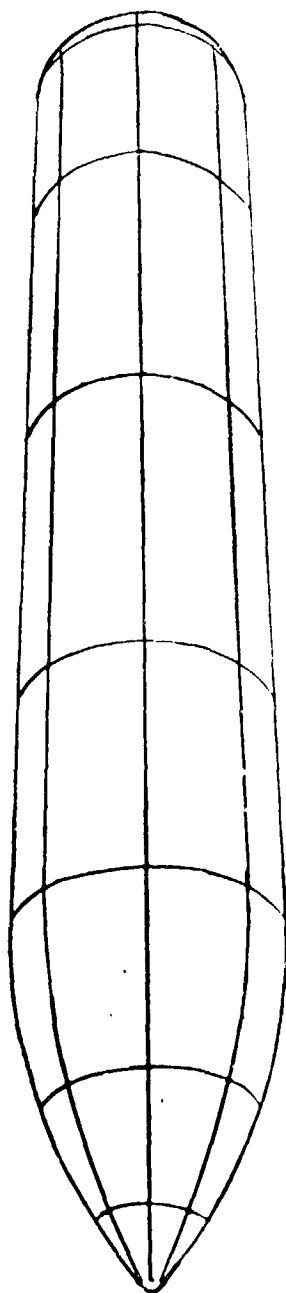
936 7 0°

BOTTOM (B)  
TANK ALONG  
 $\alpha = 0^\circ$



3819 T @0°

TOP (T)  
TANK ALONE  
 $\alpha = 0^\circ$



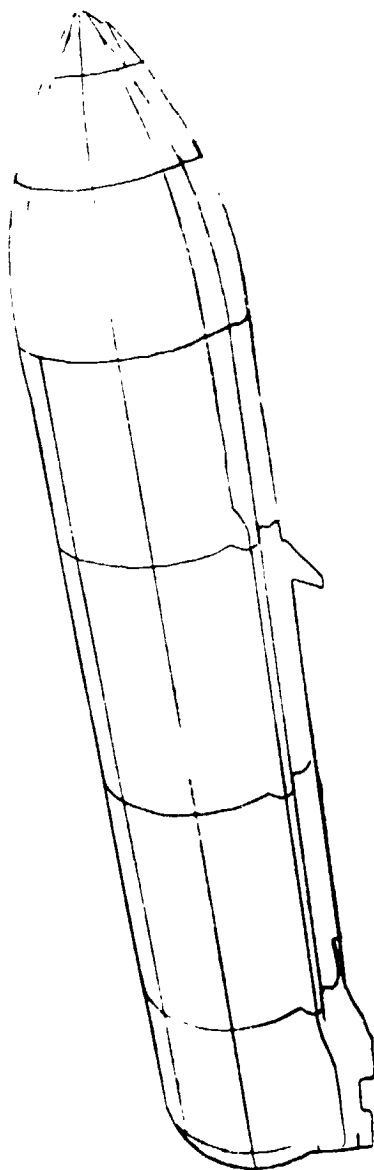
1260 T C-5°

(10)

LOWER SIDE (LS)

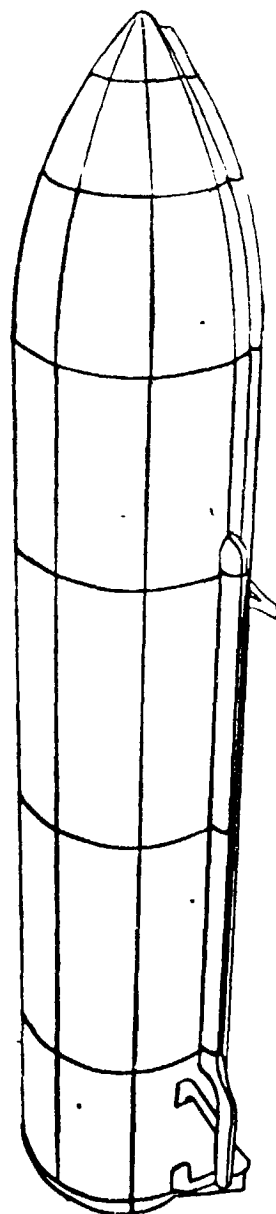
TANK ALONE

$\alpha = -5^\circ$



7930 T 0-5°

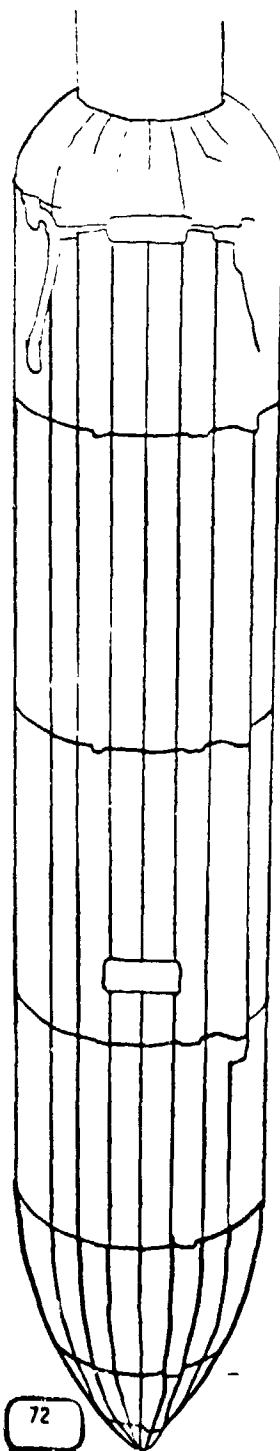
UPPER SIDE (US)  
TANK ALONE  
 $\alpha = -5^\circ$





4376 T -5°

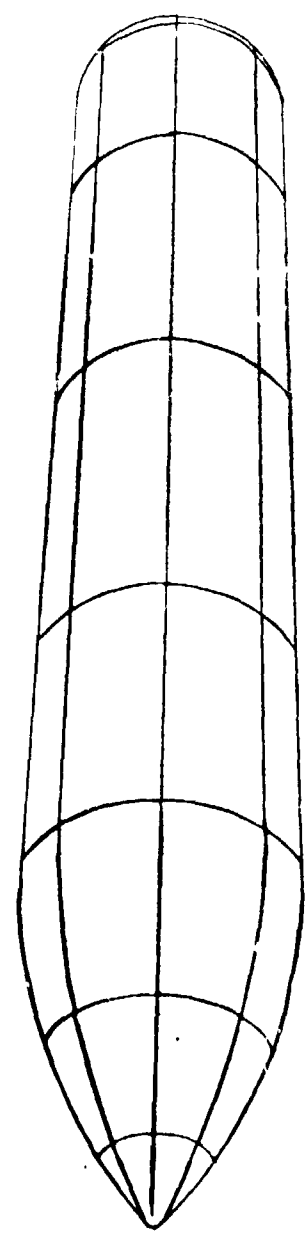
BOTTOM (B)  
TANK ALONE  
 $\alpha = -5^\circ$



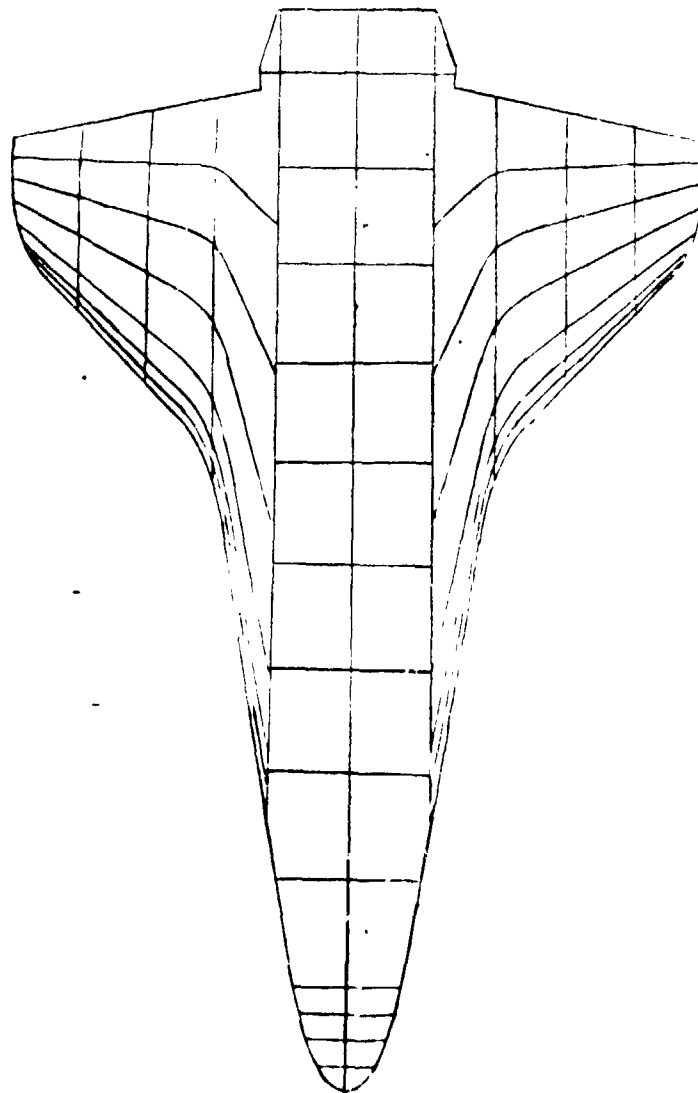
72

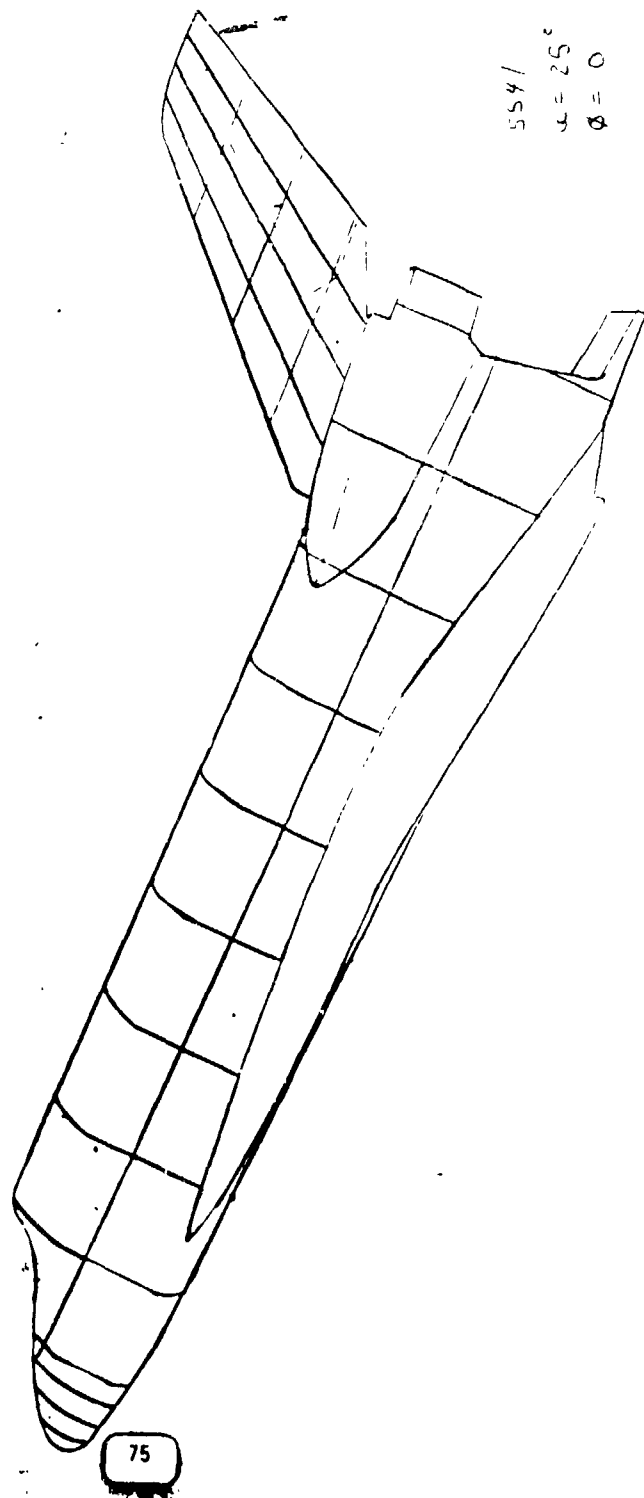
Top ( $\pi$ )  
True Nose  
 $\alpha = -5^\circ$

3819 T @ -5°



8592  
 $\alpha = 25^\circ$   
 $\theta = 0^\circ$





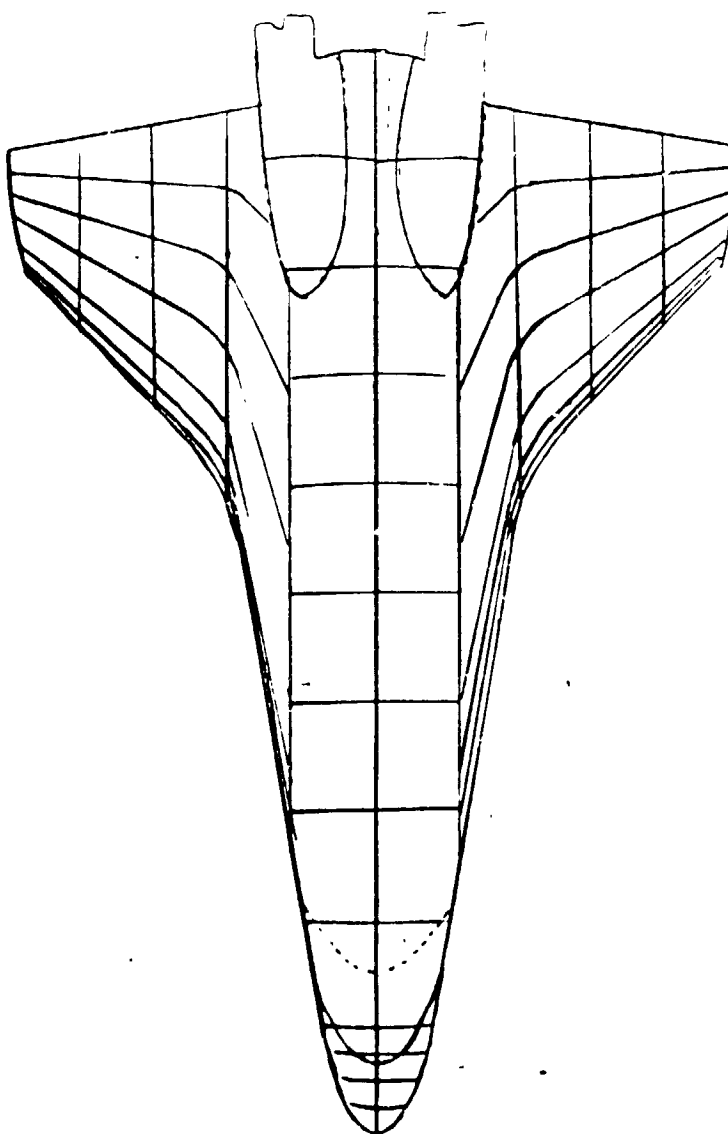
5541  
 $\alpha = 25^\circ$   
 $\phi = 0$

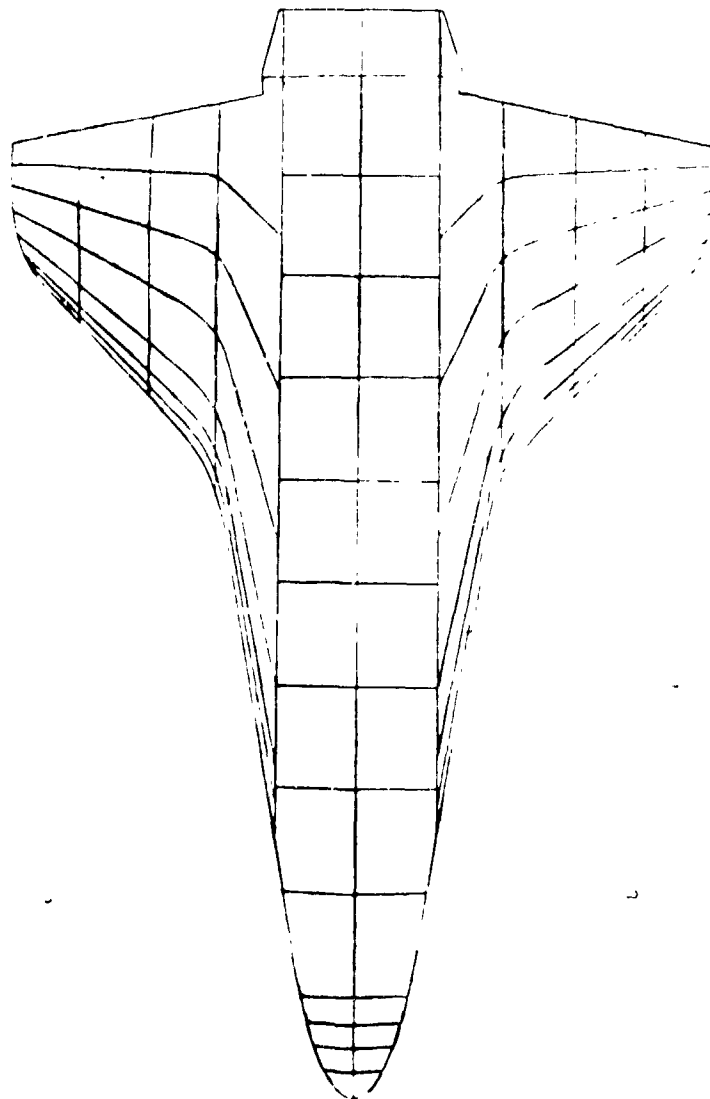
MDG

75

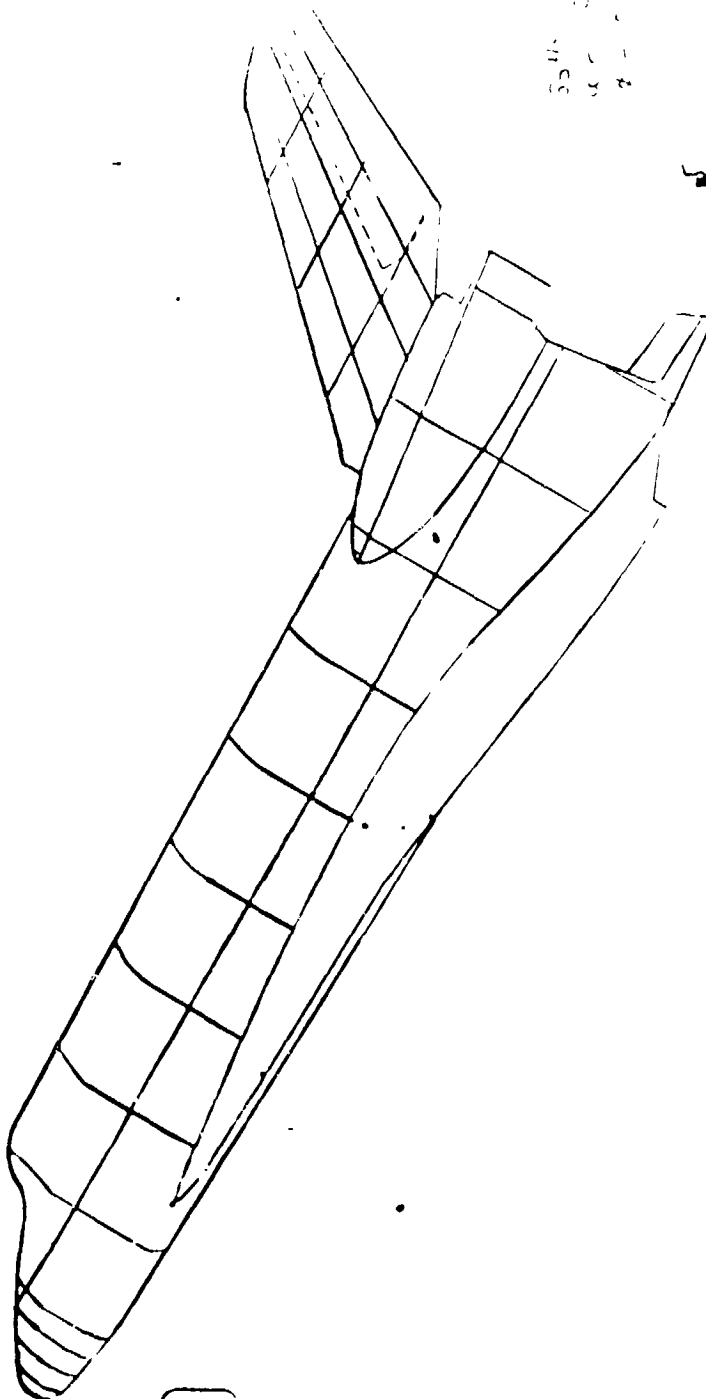
4525  
u-25°  
p. 0

W3



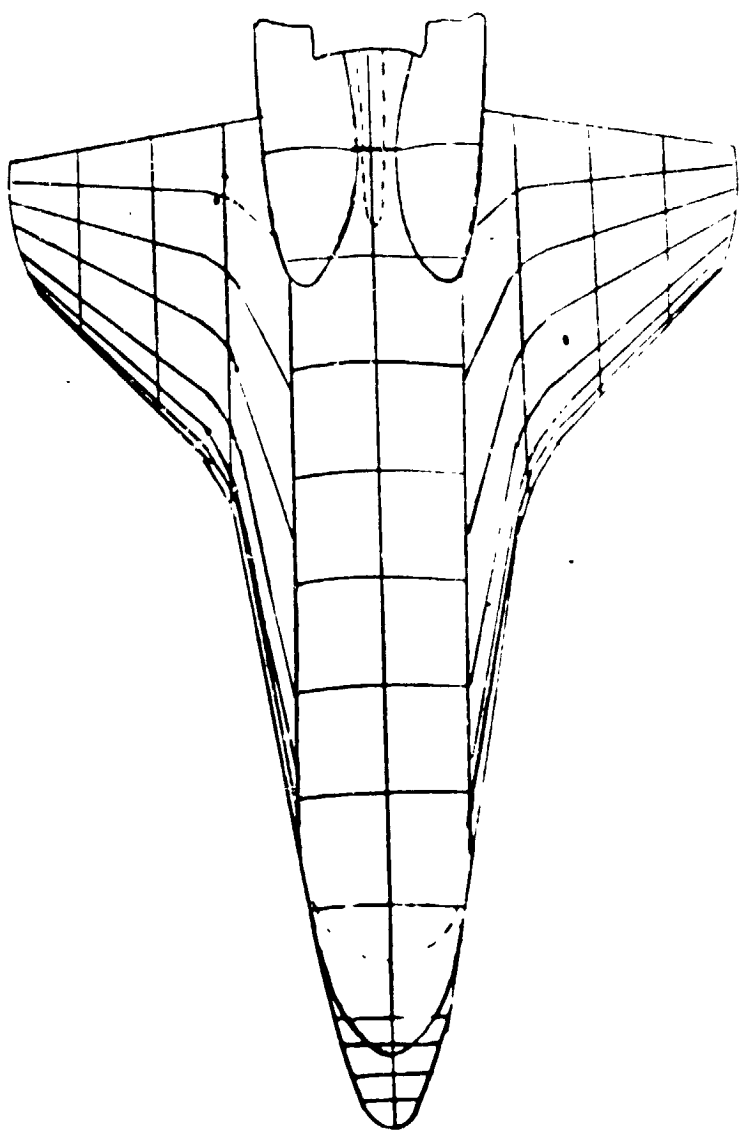


0595  
 $\alpha = 30^\circ$   
 $\phi = 0^\circ$



7028  
 $\alpha = 50^\circ$   
 $\phi = 0$

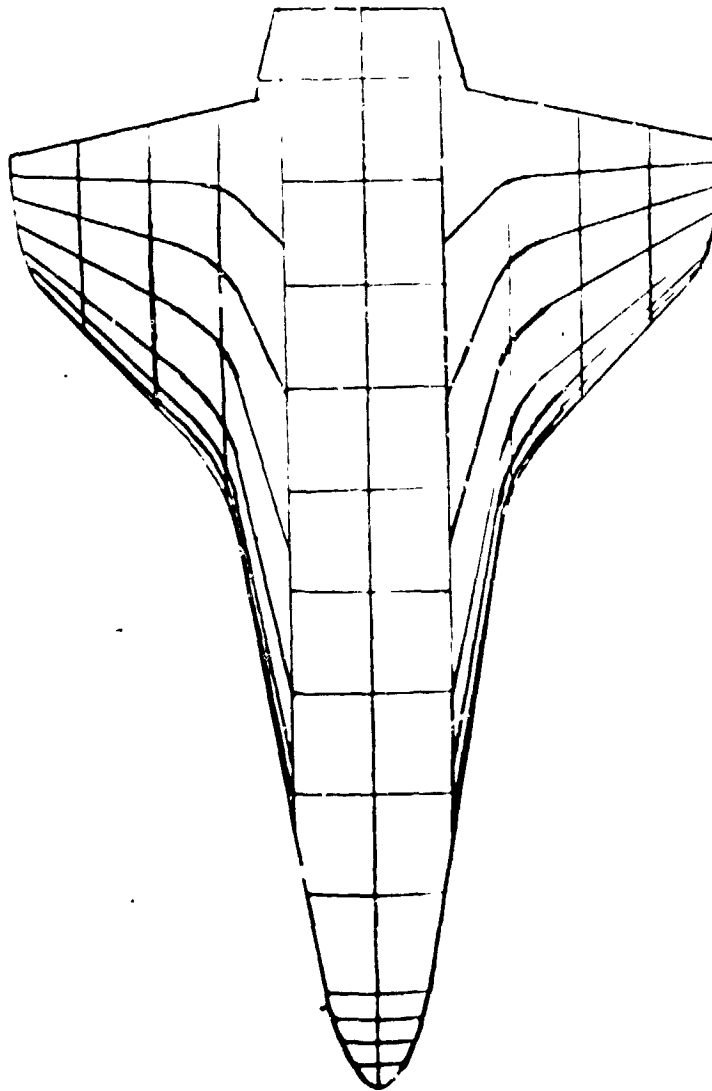
505

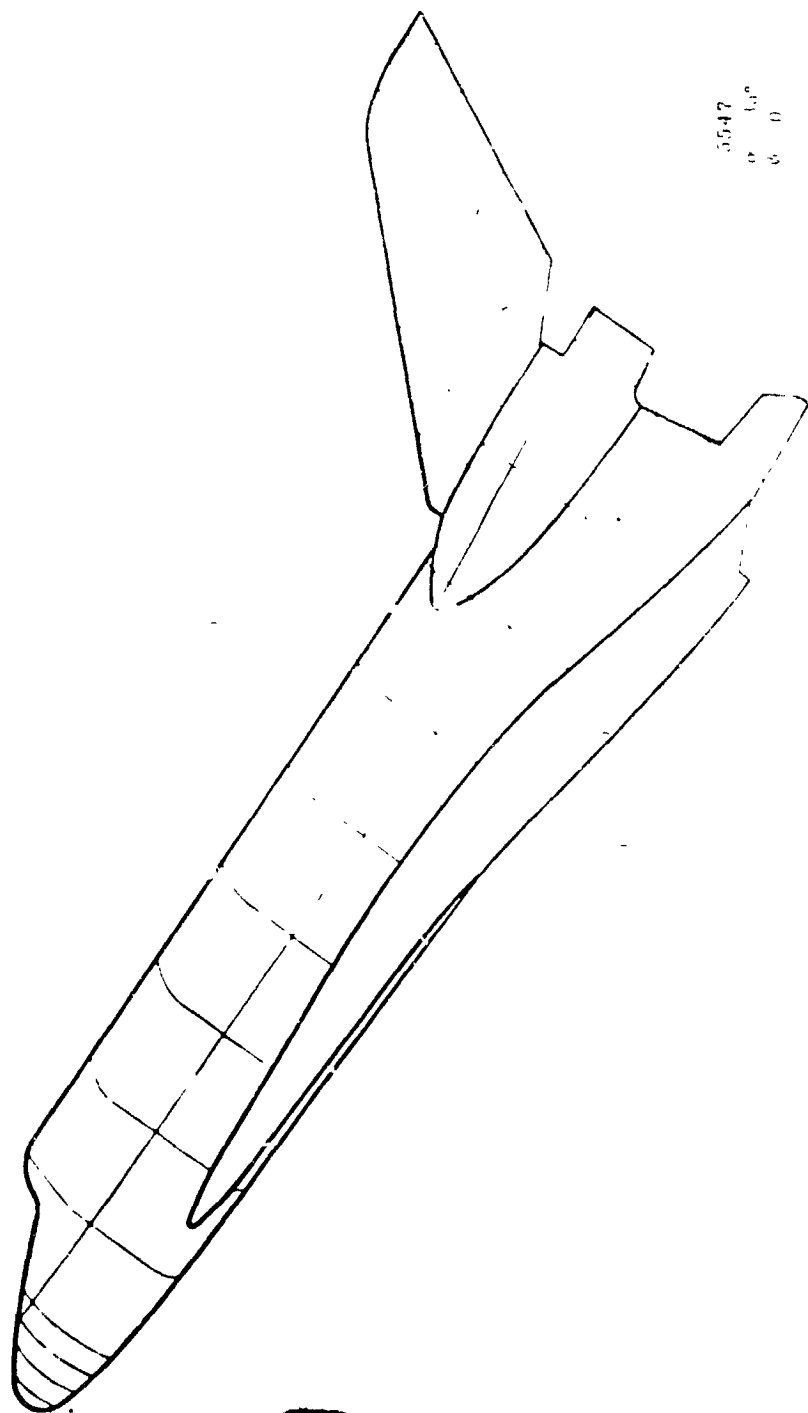




8398  
45 110  
A-100

ms

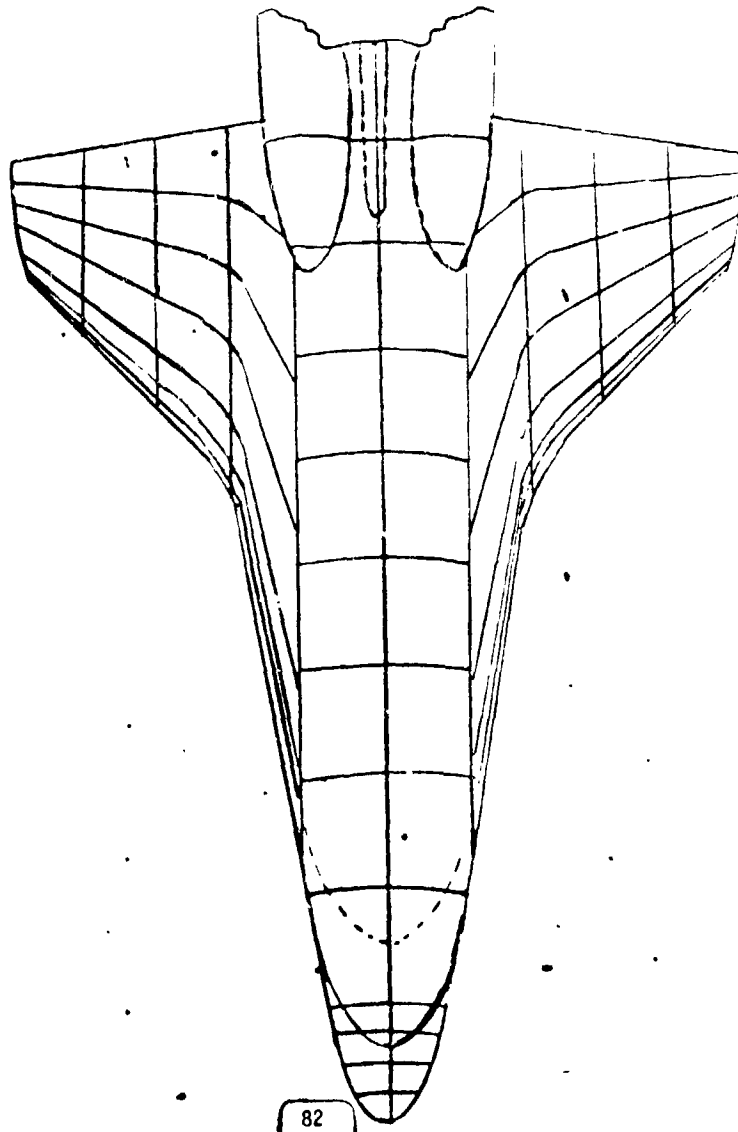




5547  
or 1.1°  
6 0

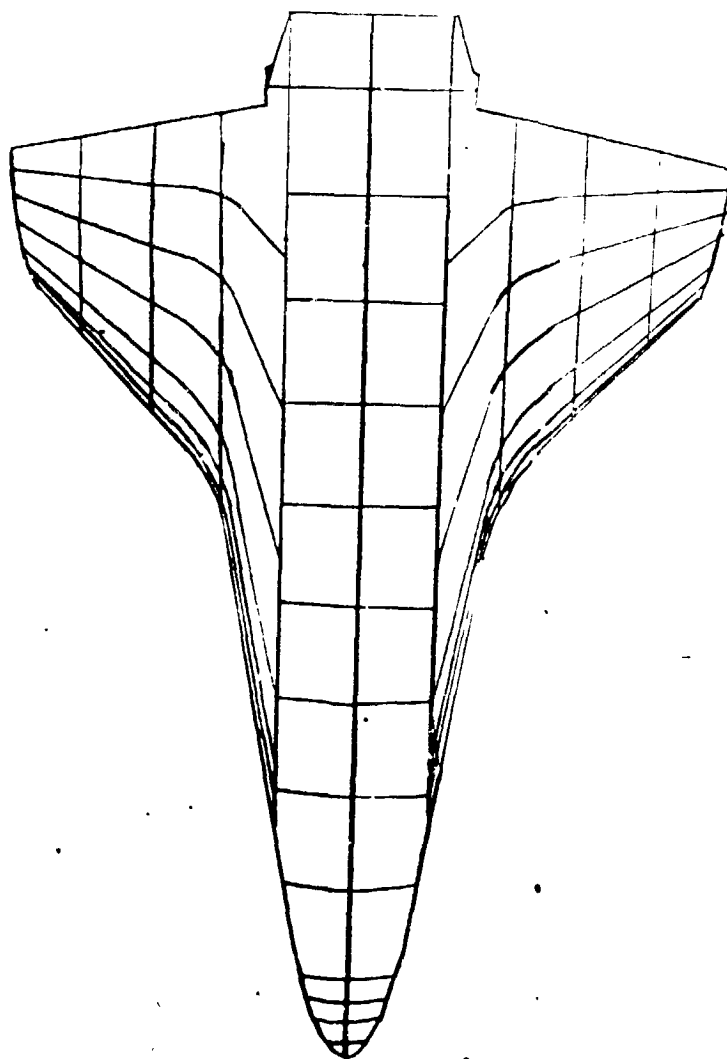
4531  
α-35°  
φ-6

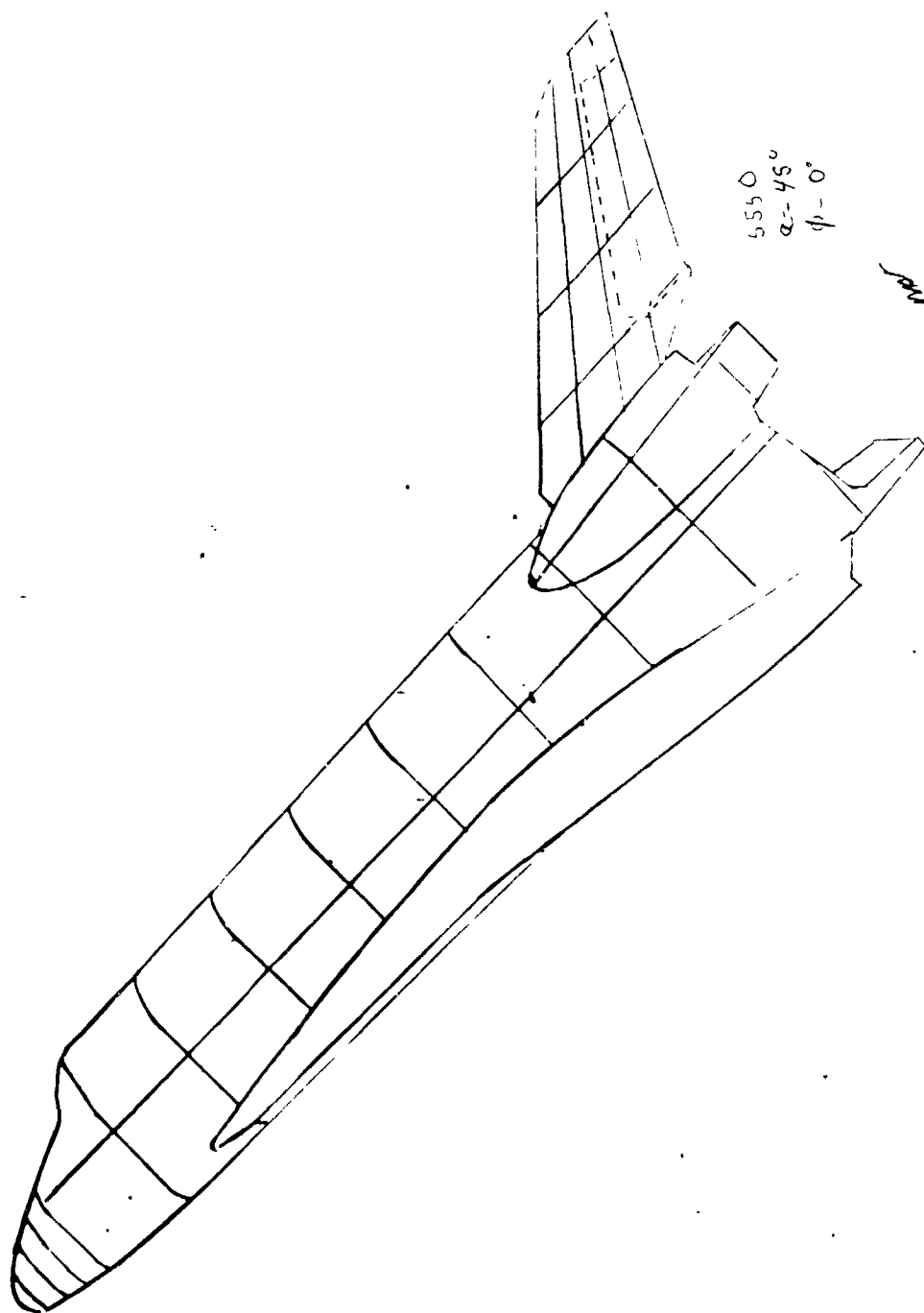
ms

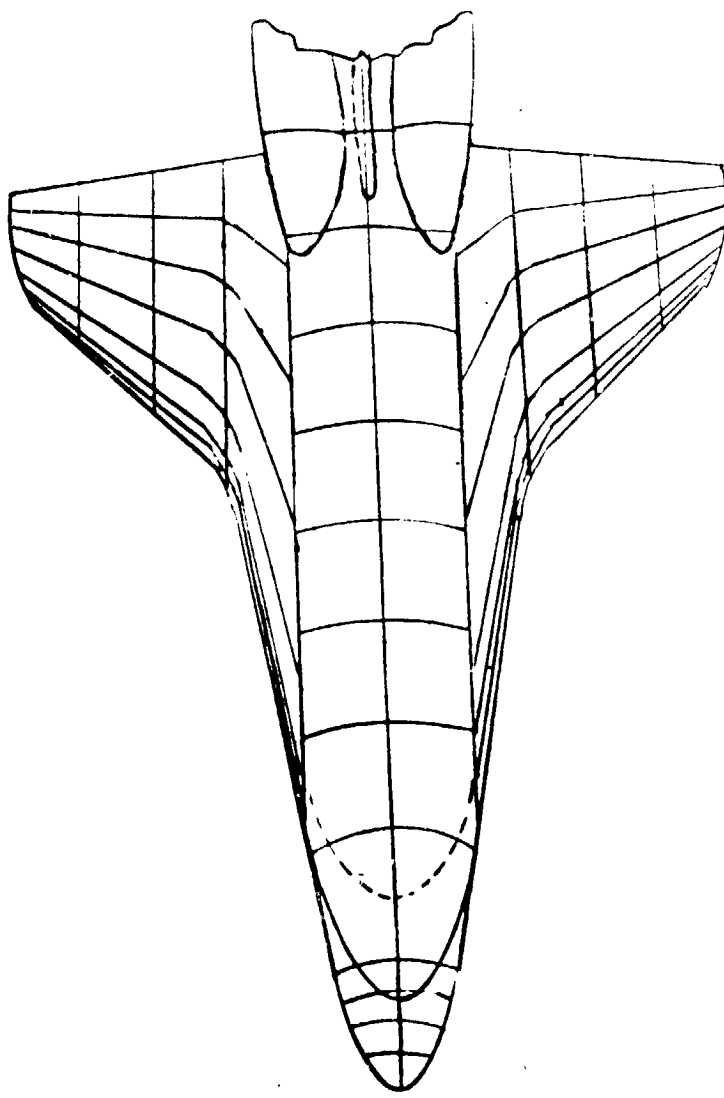


U.S.S.  
45°  
φ = 0

ms





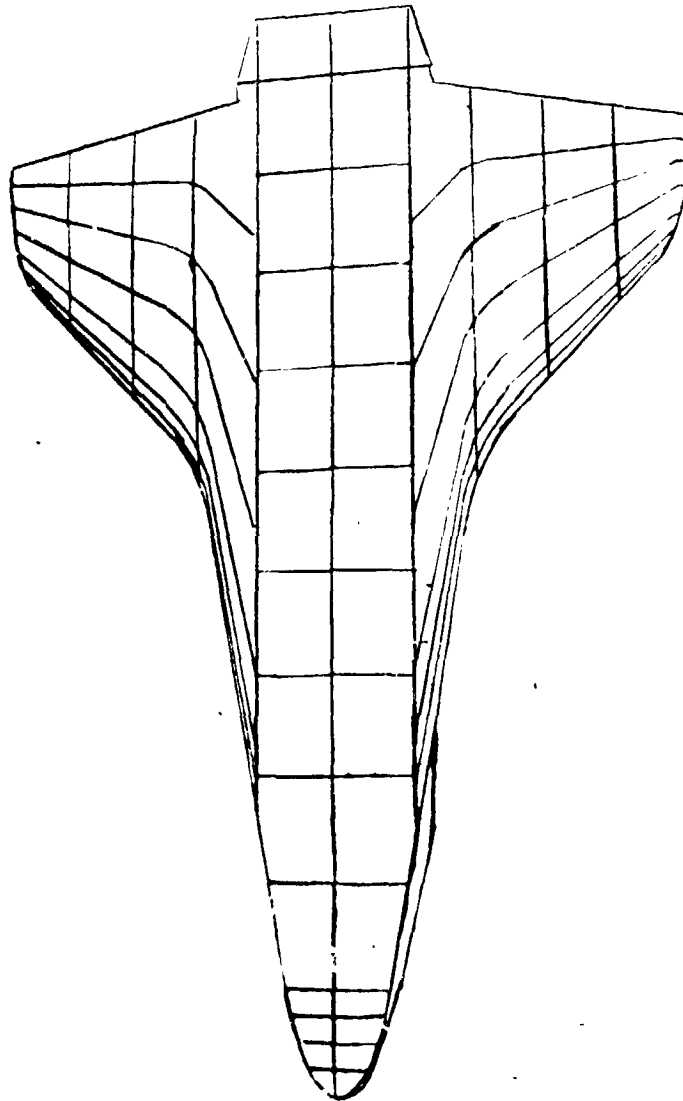


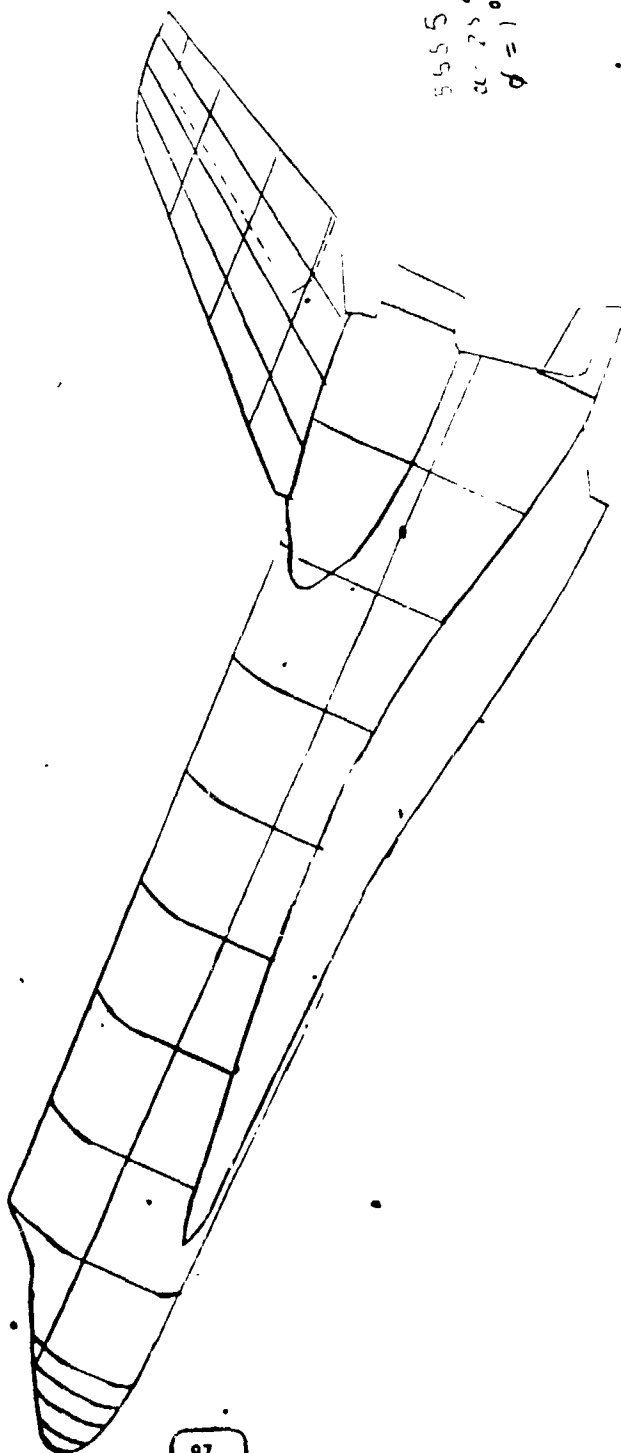
$\gamma_{534}$   
 $\alpha$   $45^\circ$   
 $\phi$   $0$

ms

8622  
 $\alpha = 25^\circ$   
 $\phi = 1^\circ$

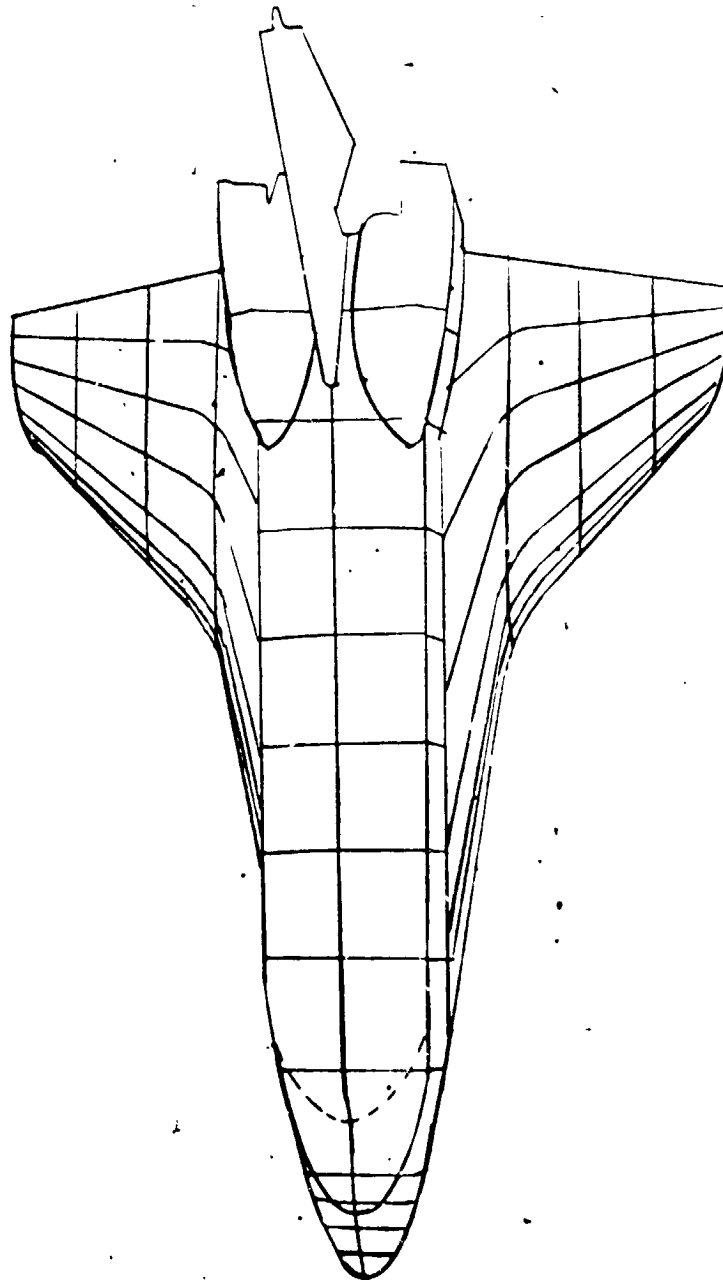
MS





$\theta = 0$   
5555  
5555





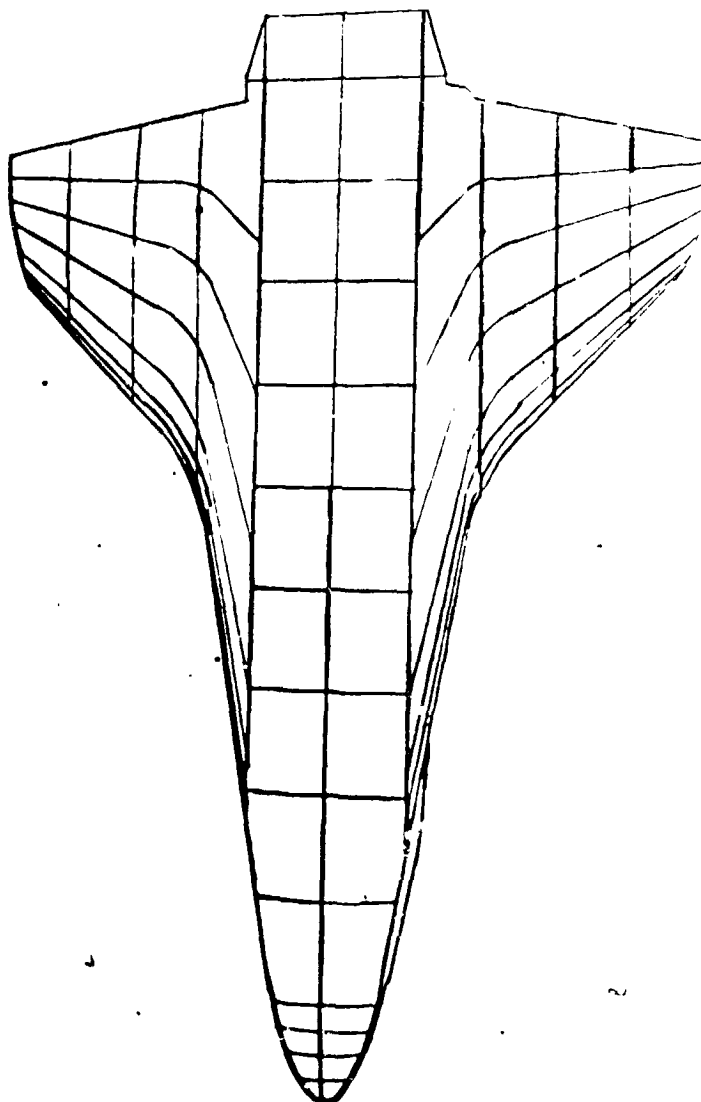
88

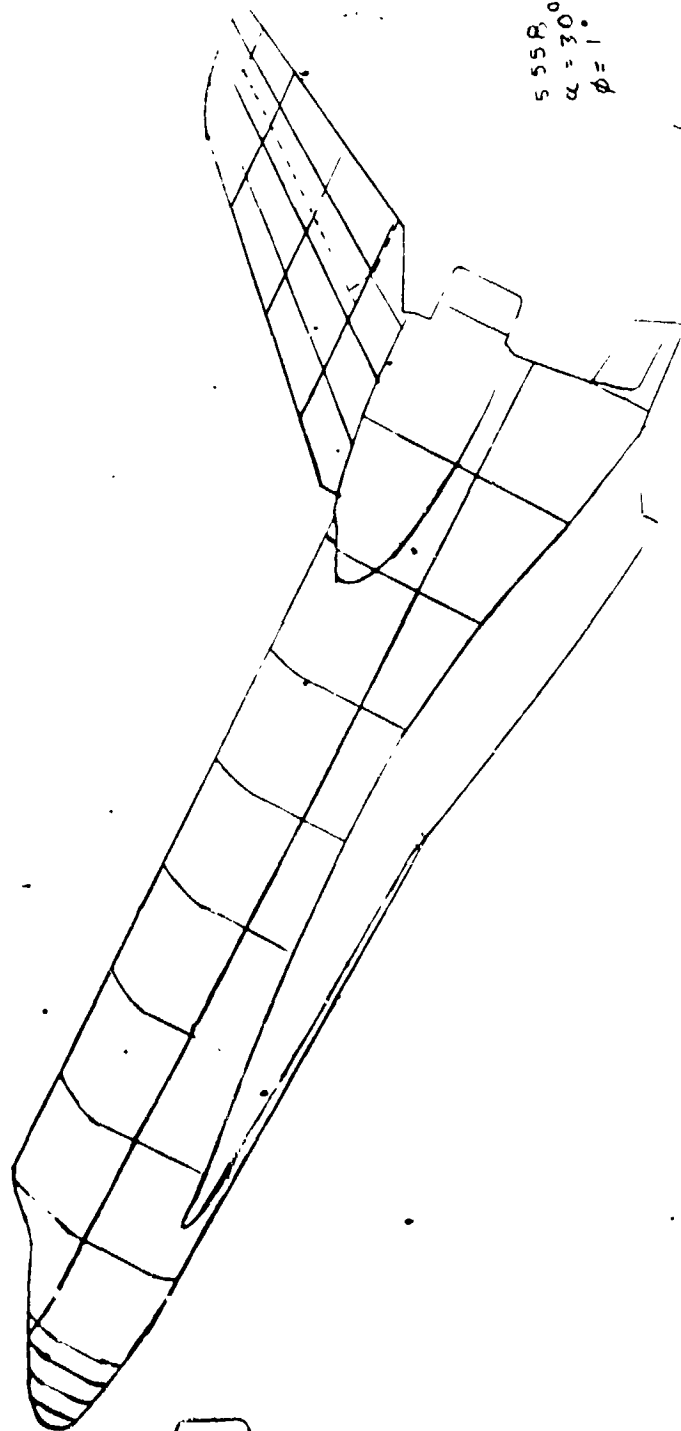
4558  
 $\alpha = 25^\circ$   
 $\phi = 1^\circ$

MS

8628  
 $\alpha = 30^\circ$   
 $\phi = 1^\circ$

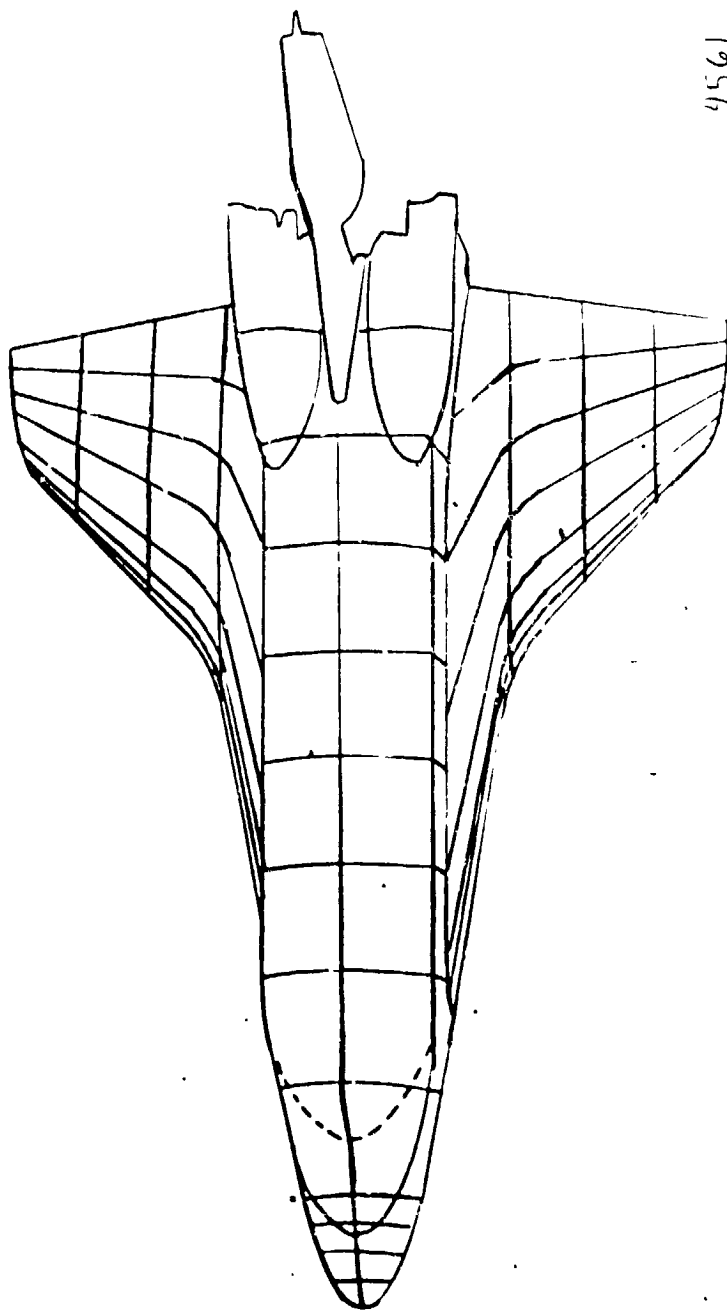
115





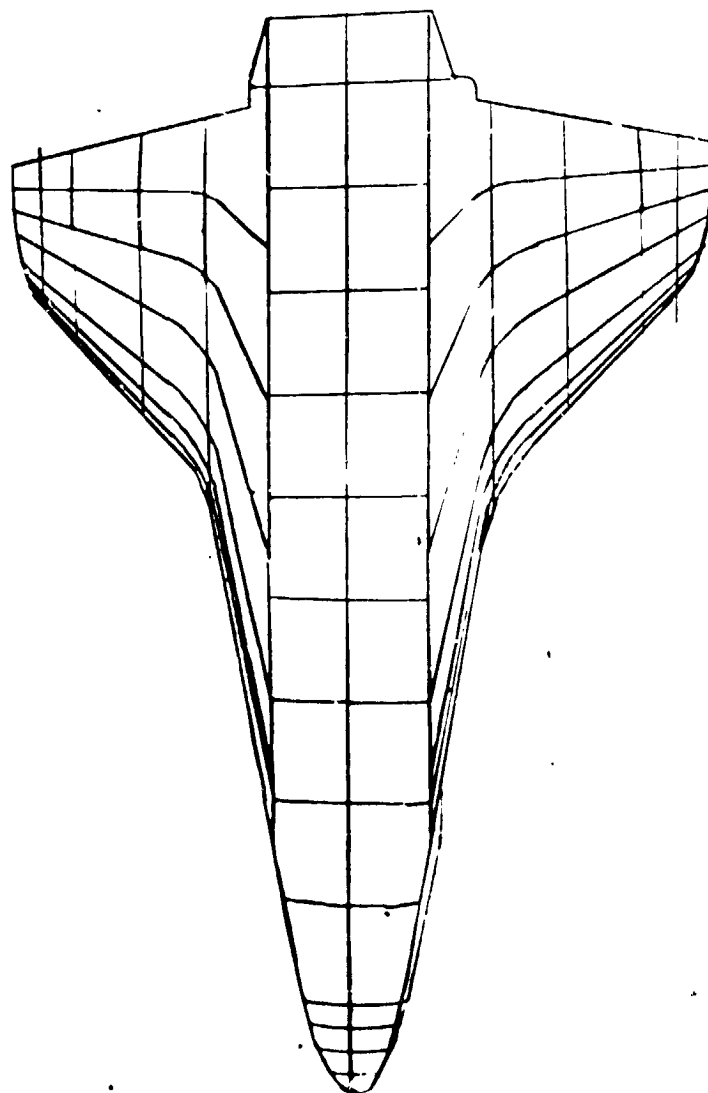
$555R_0$   
 $\alpha = 30^\circ$   
 $\phi = 1^\circ$

90



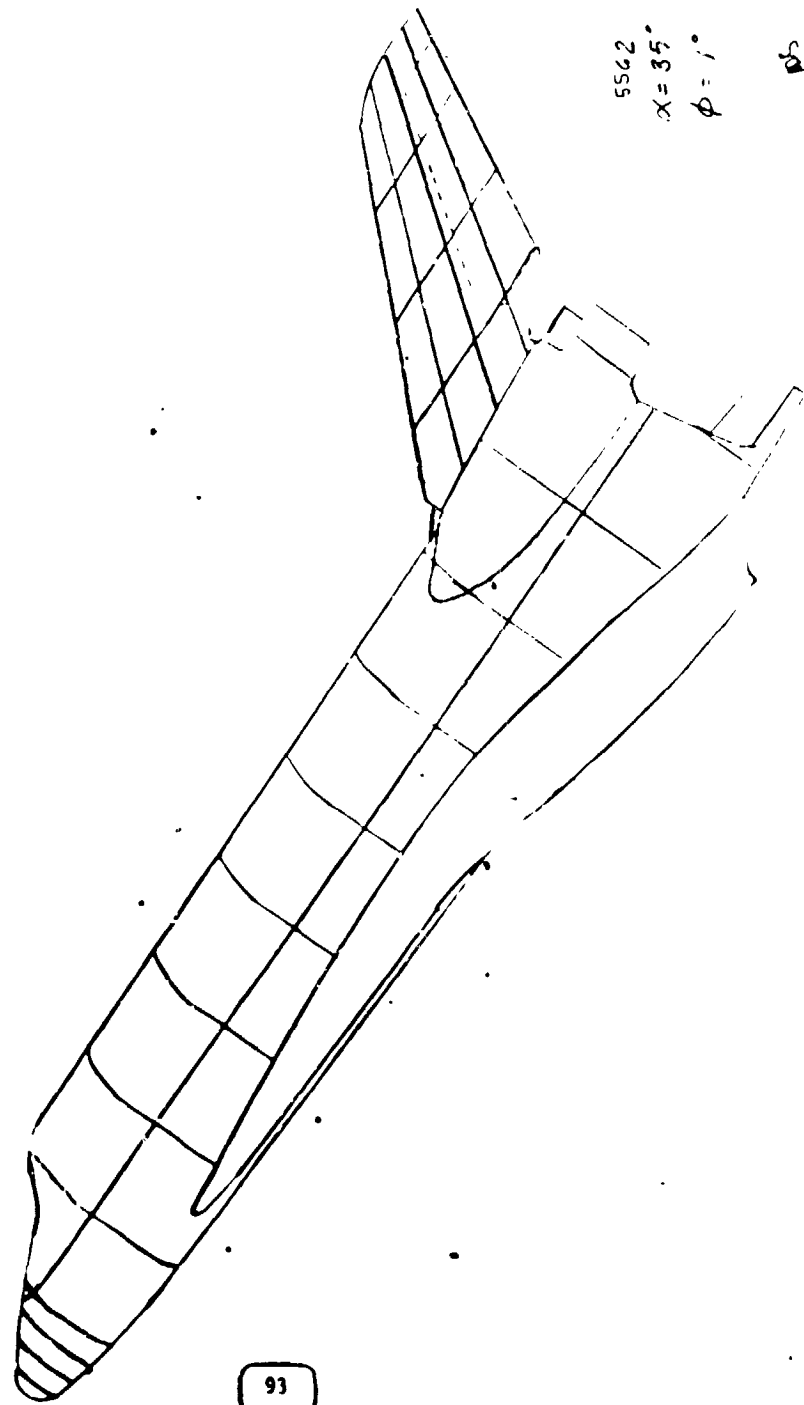
4561  
 $\alpha = 30^\circ$   
 $\phi = 7^\circ$

ms

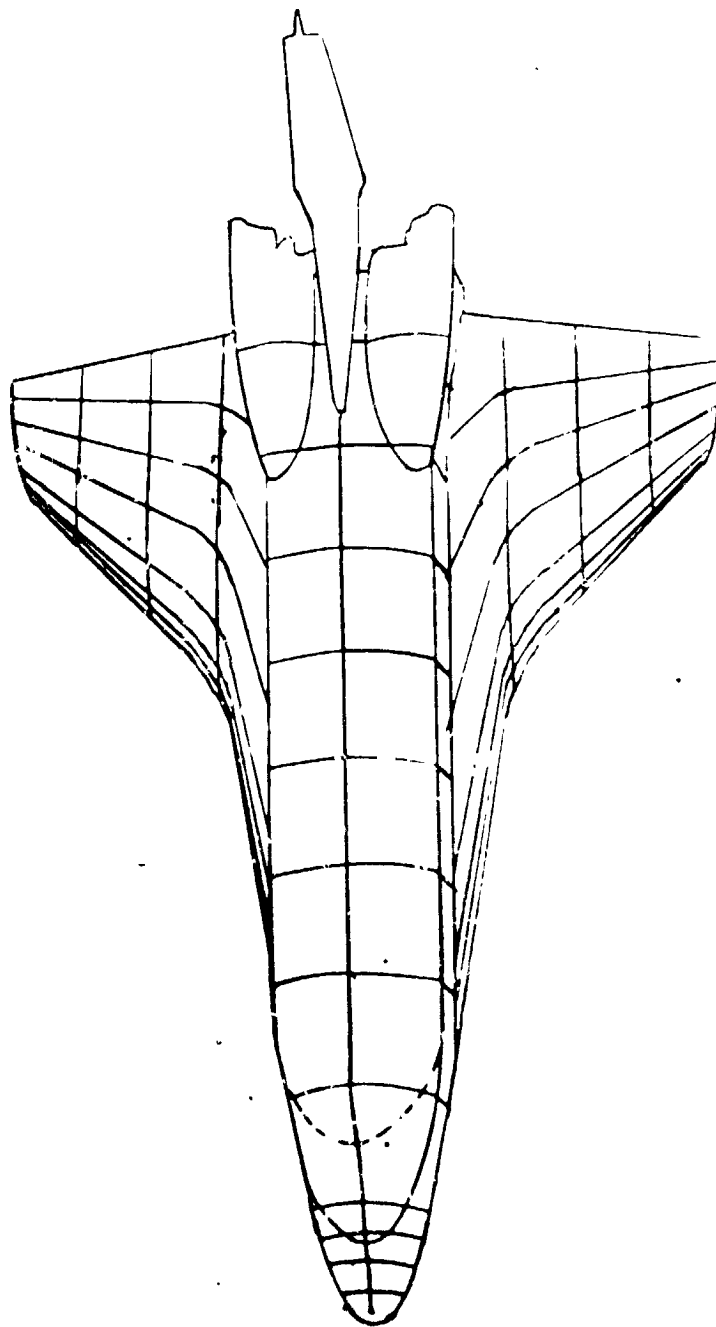


8634  
 $\alpha = 35^\circ$   
 $\phi = 1^\circ$

MS



5562  
 $\alpha = 35^\circ$   
 $\phi = 1^\circ$   
p5

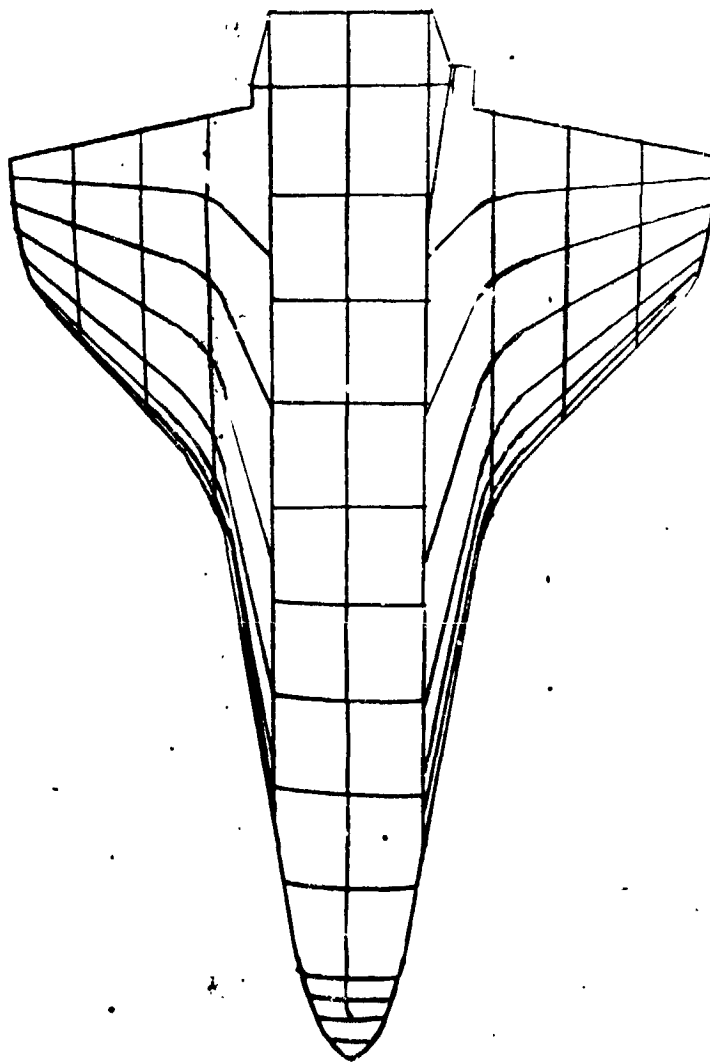


4567  
 $\alpha = 35^\circ$   
 $\phi = 1^\circ$

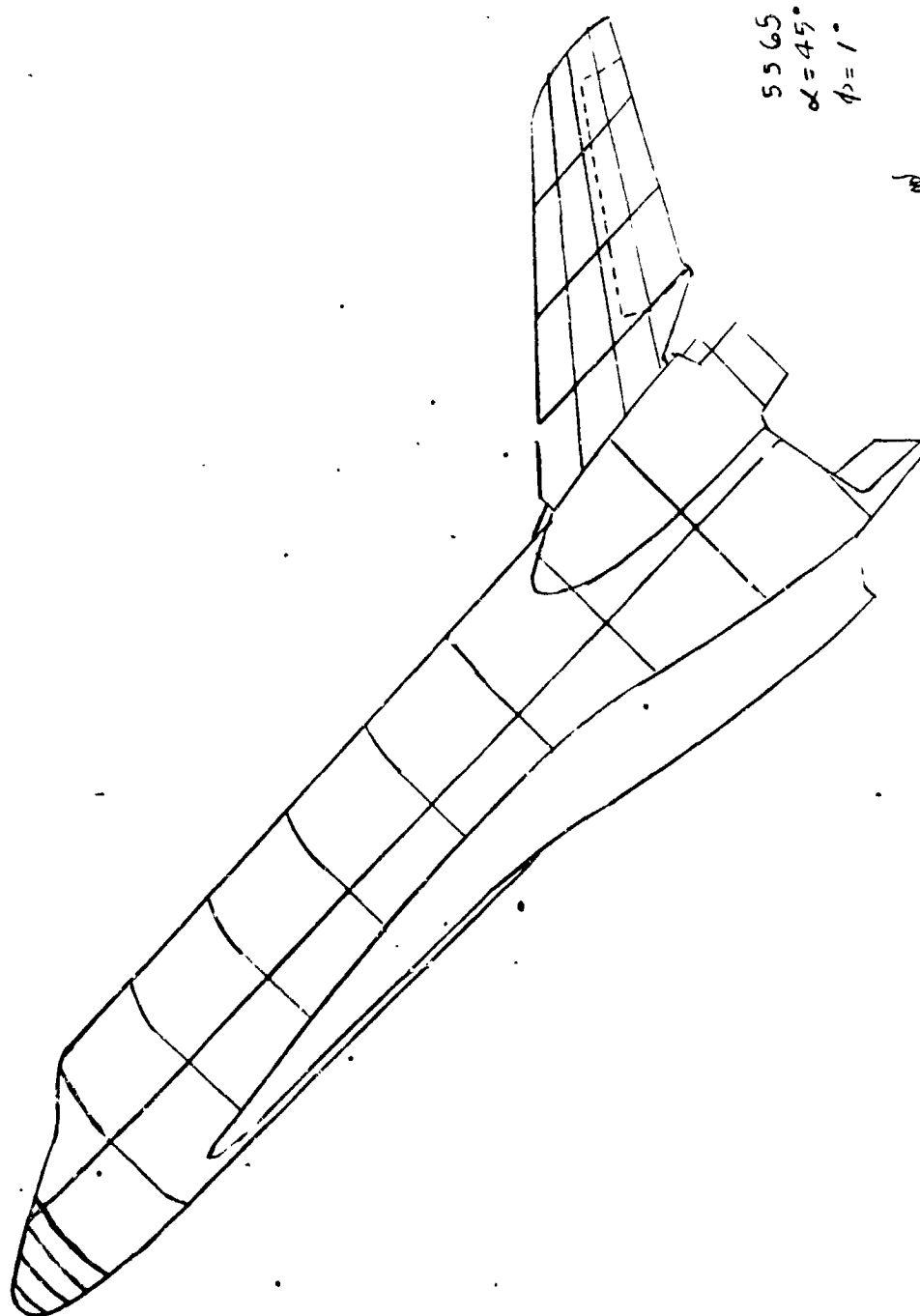
no

8637  
 $\alpha = 45.0^\circ$   
 $\phi = 1^\circ$

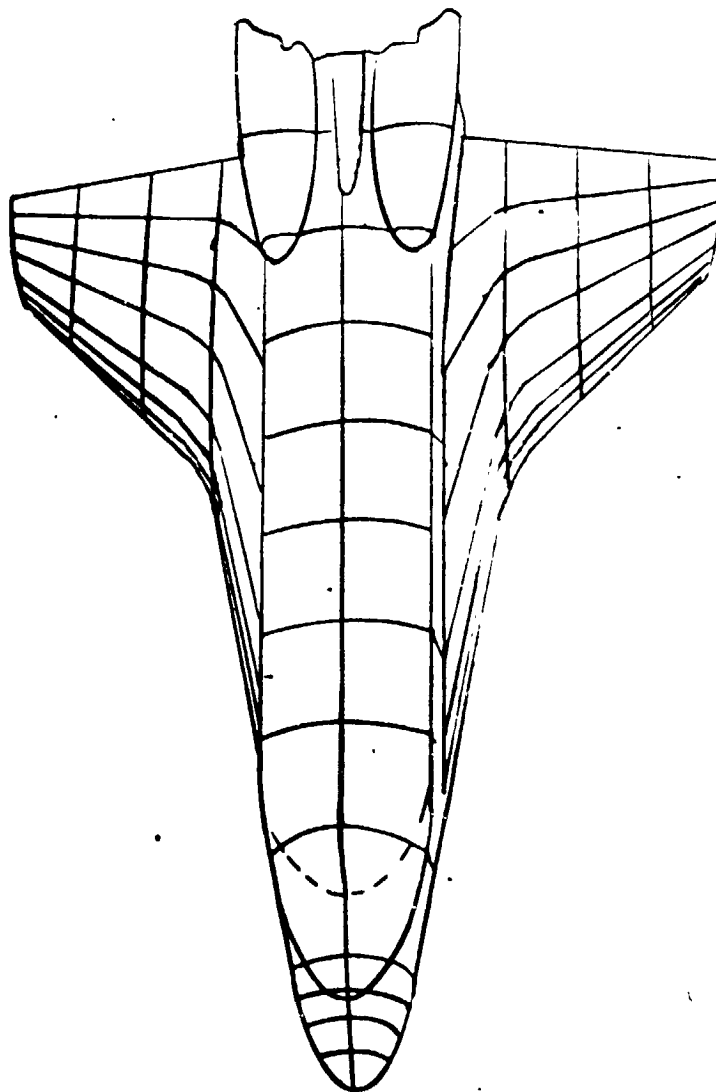
ms

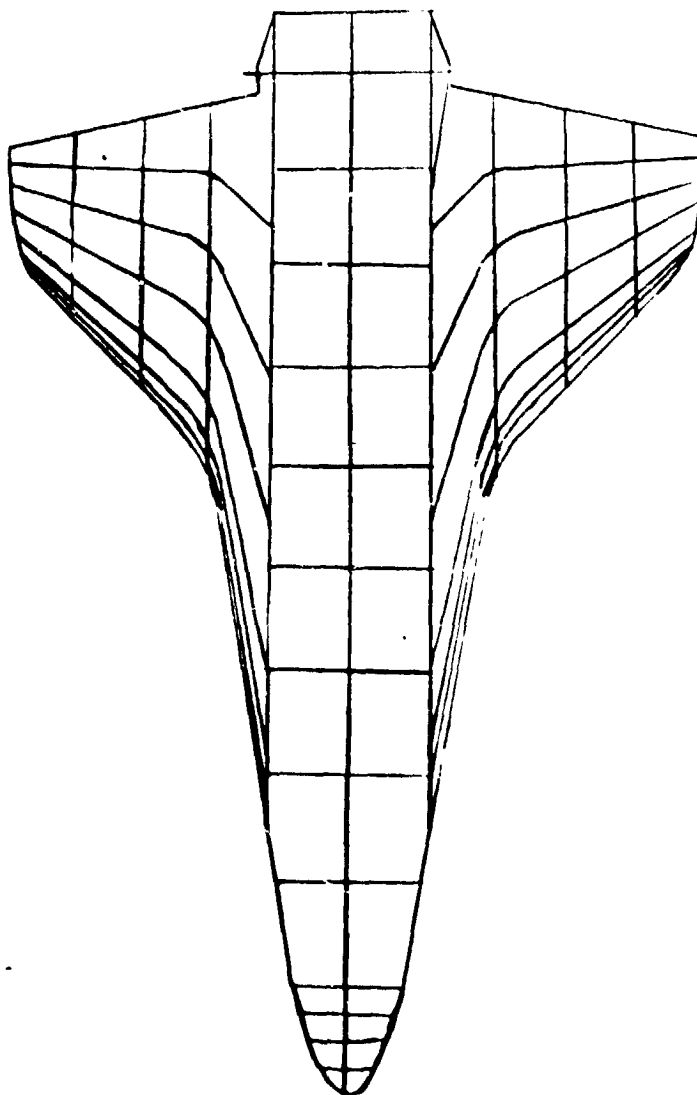






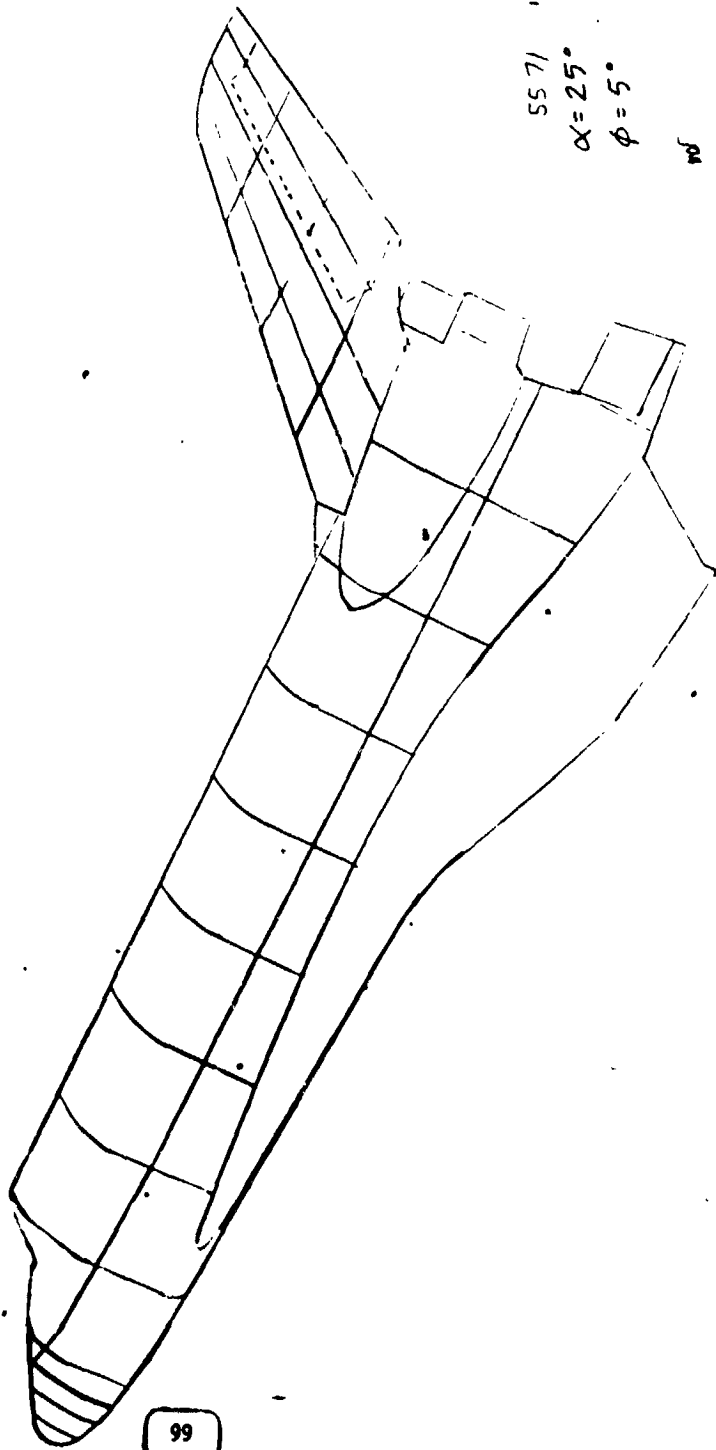
4270  
 $\alpha = 45^\circ$   
 $\phi = 1^\circ$



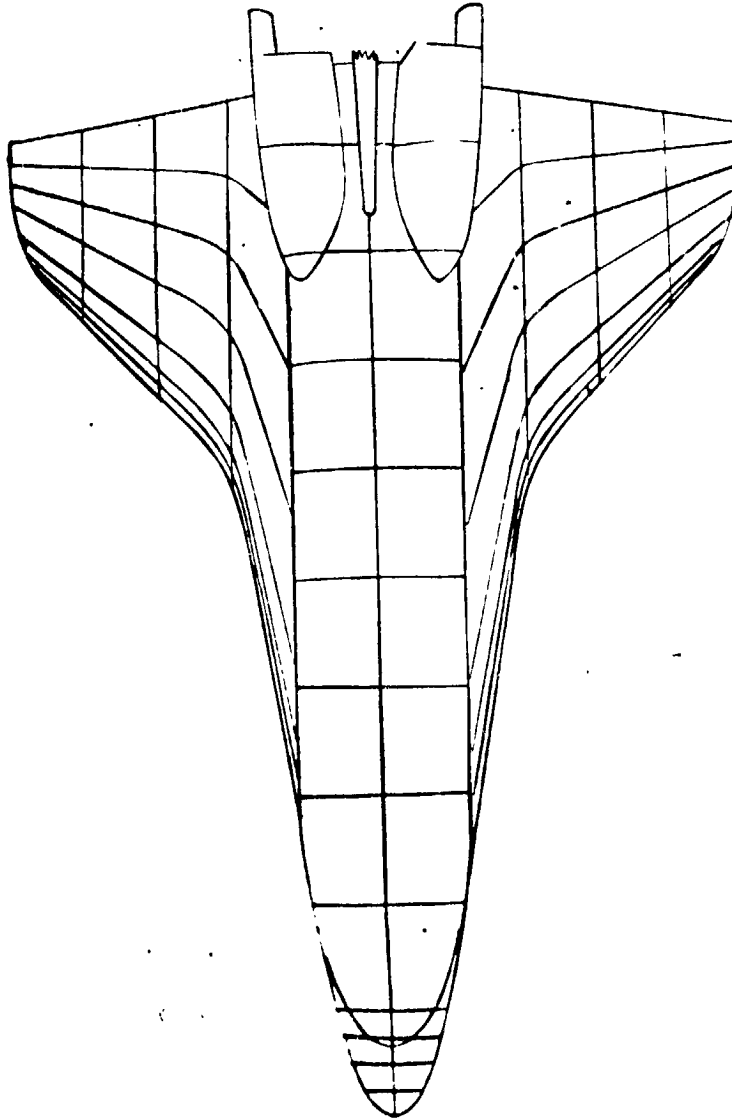


8610  
 $\alpha = 25^\circ$   
 $\phi = 5^\circ$

SSM



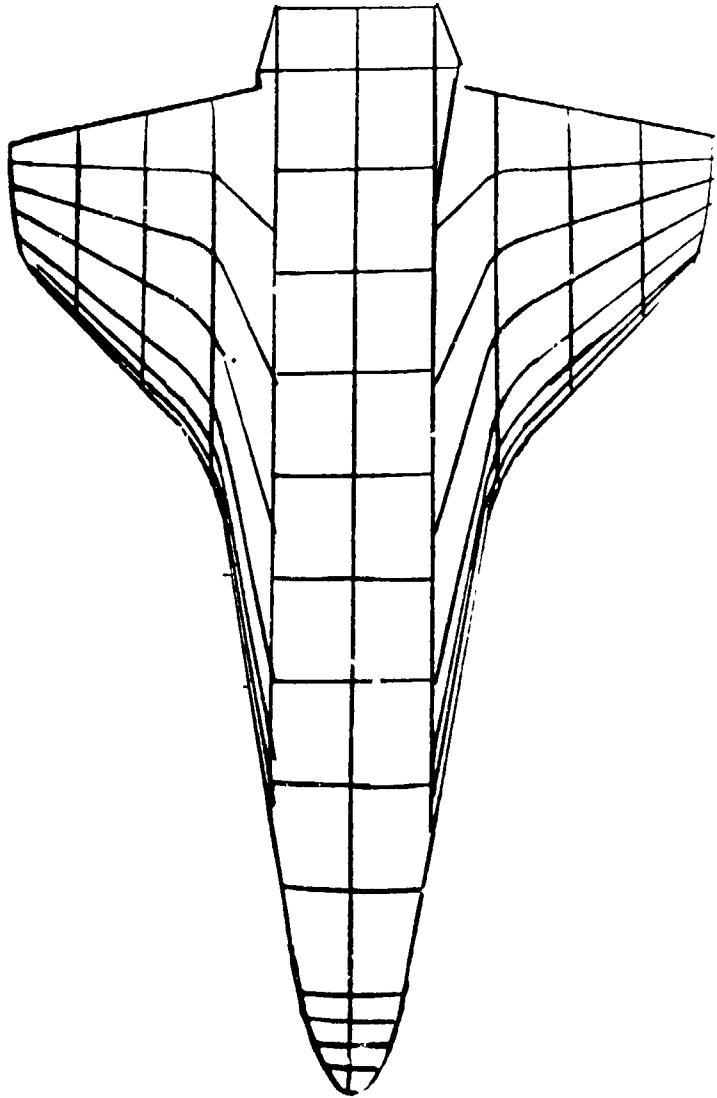
4543  
 $\alpha = 25^\circ$   
 $\phi = 5^\circ$

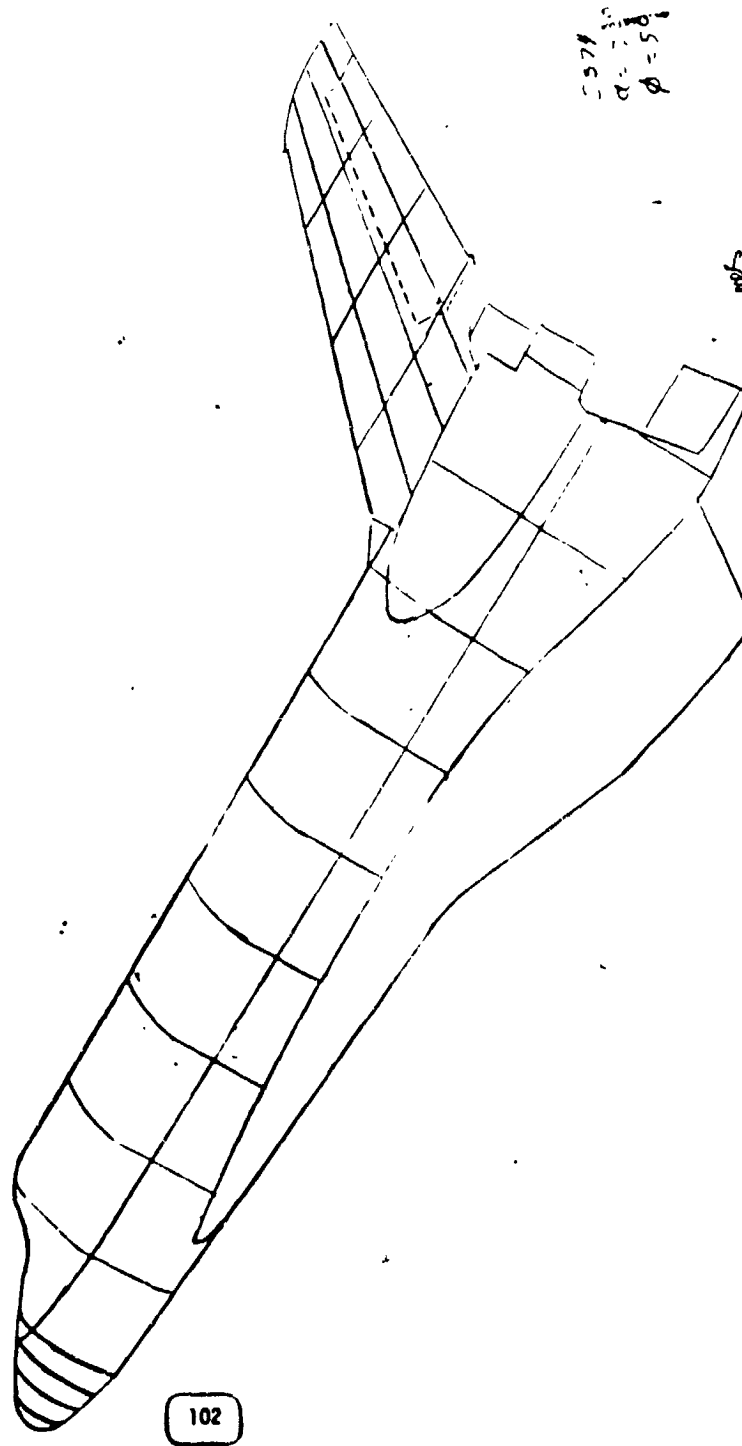


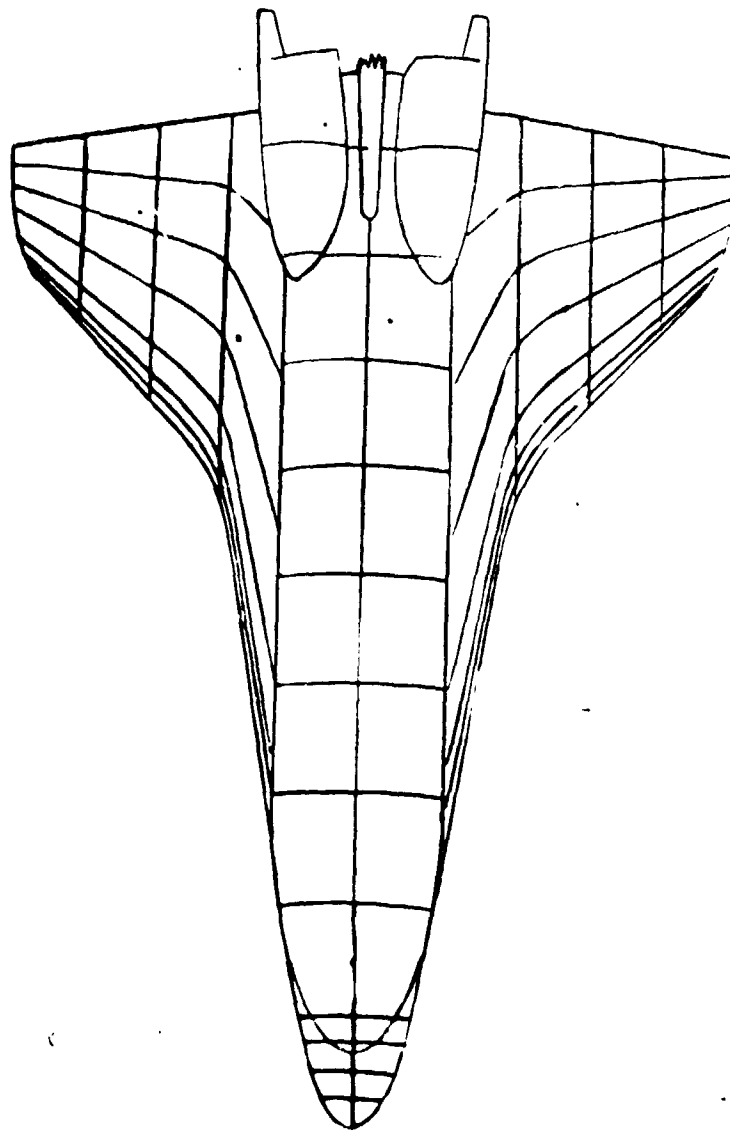
100

8613  
 $\alpha = 30^\circ$   
 $\phi = 5^\circ$

MS





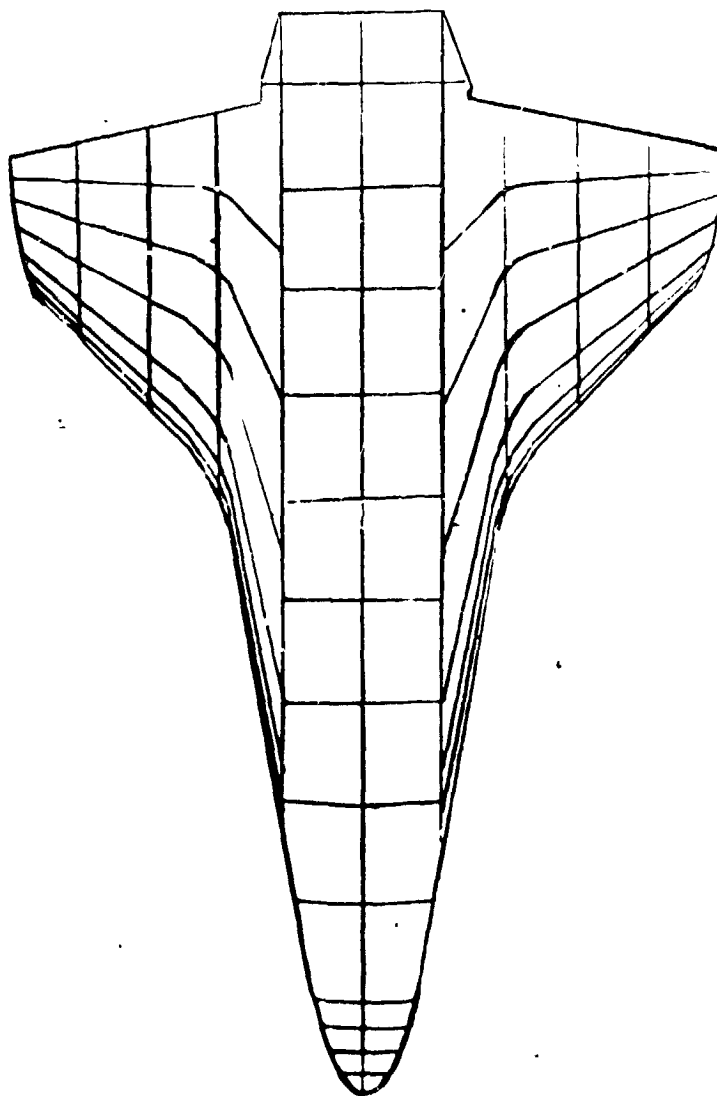


4546  
 $\alpha = 30^\circ$   
 $\phi = 5^\circ$

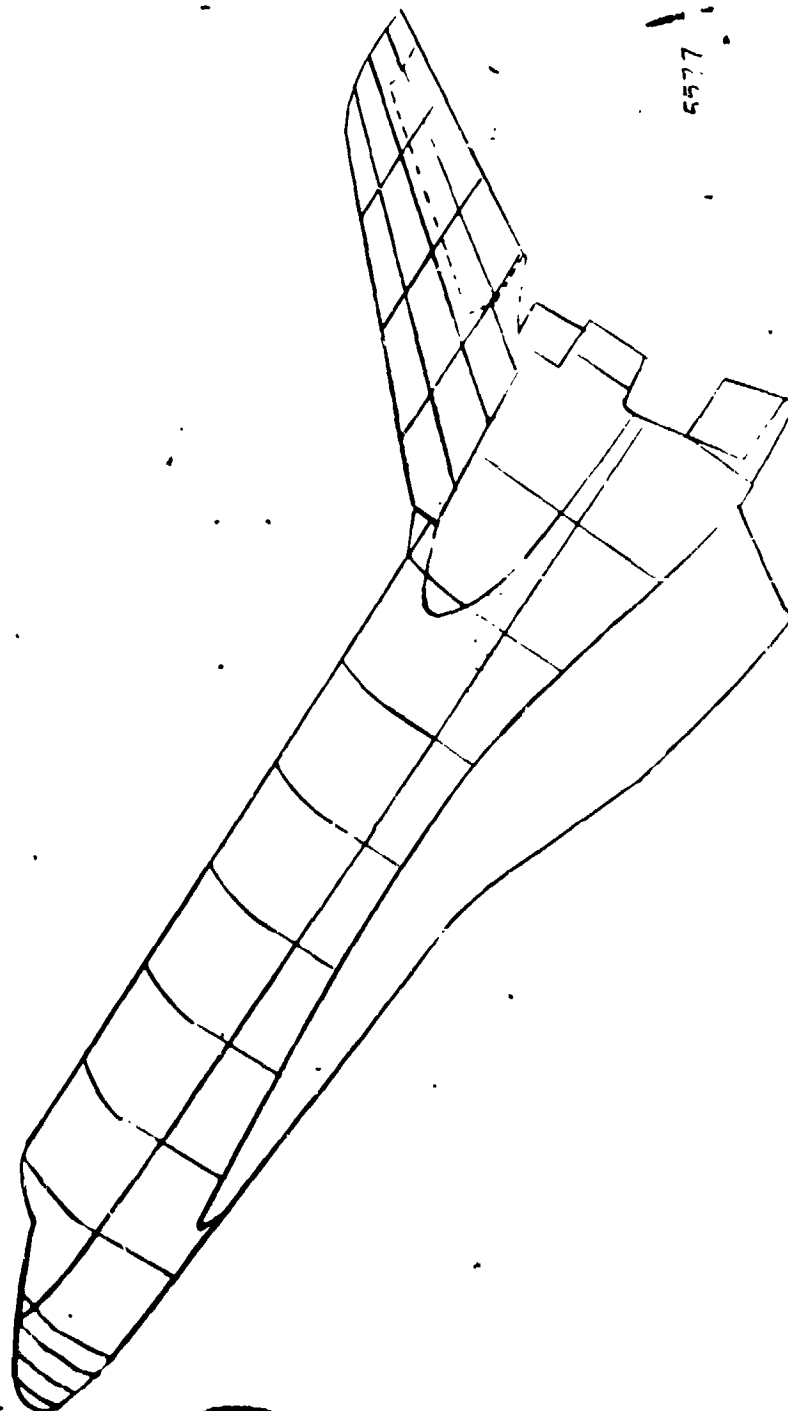


8616  
 $\alpha = 35^\circ$   
 $\phi = 5^\circ$

ms



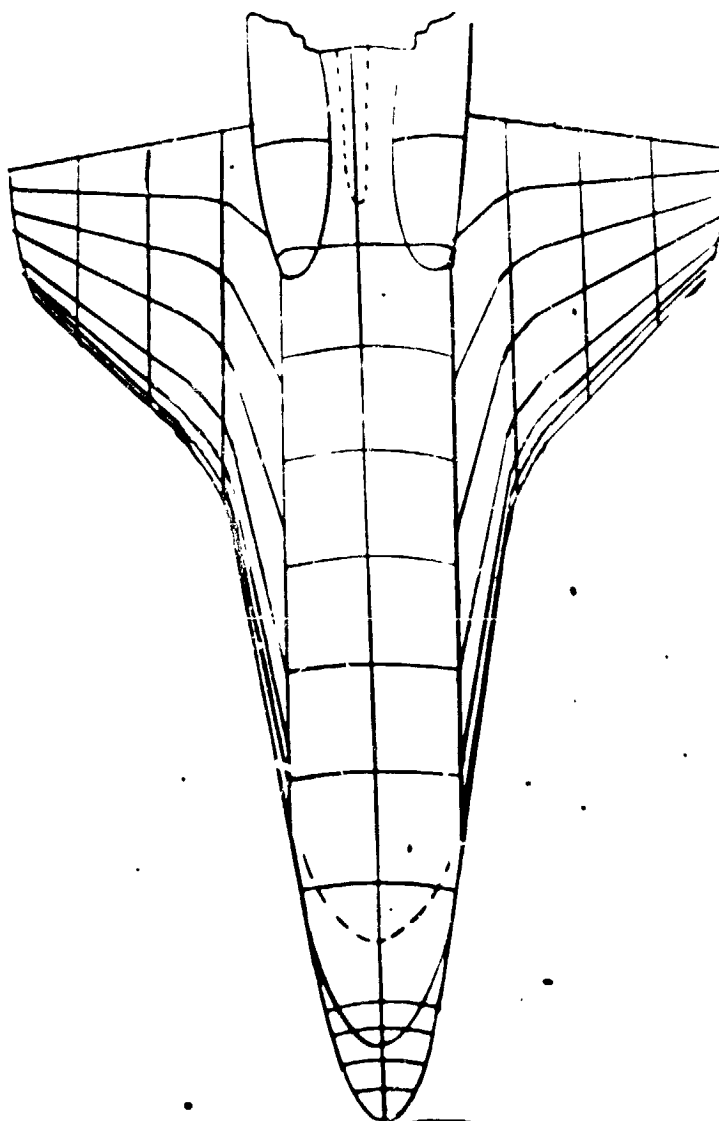
REPRODUCIBILITY OF THE ORIGINAL PAGE IS POOR.



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4549  
 $\alpha = 35^\circ$   
 $\phi = 5^\circ$

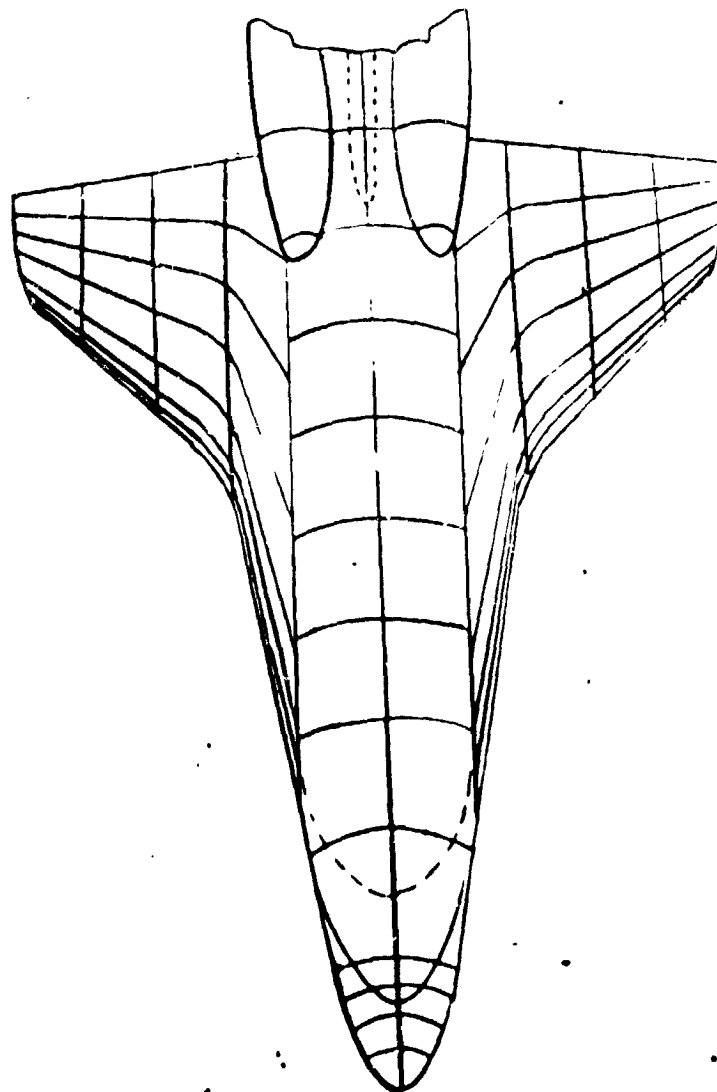
WDS



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$$\alpha = 45^\circ$$
$$\phi = 5^\circ$$



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TABLE 3  
PHASE CHANGE COATING TEST DATA SUMMARY SHEET

TEST TITLE: PHASE CHANGE PAINT TESTS OF A ROCKWELL ORBITER/TANK CONFIG.

TEST NUMBER: OH3A TEST FACILITY: AEDC B

TEST DATE: 6-28-73 TEST ENGINEER: M. Quan

Run No.	Model Configuration Identification	Model Scale	Free Stream Mach Number	Total Pressure (psia)	Total Temp. (°F)	Initial Temp. (°F)	RNX106 Ft	Phase Change Temp. (°F)	ORB. Position (degrees)			TANK Position (deg)	
									$\alpha$	$\beta$	$\phi$	$\alpha$	$\phi$
1	OT	.0175	8	125	740	80/80	.68	250	0	0	180	180	
2	OT					80/80		113	↓				
3	OT					76/76		250	.5				
4	OT					76/76		113	↓			↓	
5	O					78		131	0			-	
6	OT					78/78		200			↓	180	
7	OT					77/77		250			0	0	
8	OT					83/83		113			180	↓	
9	OT					79/79		113			0	↓	
10	T					78		175			-	180	
11	T					79		113	↓		-		
12	T					79		169	-5		-		
13	T (NO BOTTOM CAMERA)		↓	↓	↓	79	↓	113	↓	↓	-	↓	

\* Taw = adiabatic wall temperature

\*\* X axis parallel to stream (+downstream, -upstream)

Y axis (+right, -left, as viewed from the rear)

Z axis (+up, -down)

TABLE 3

## PHASE CHANGE COATING TEST DATA SUMMARY SHEET

TEST TITLE: PHASE CHANGE PAINT TESTS OF A ROCKWELL CRITTER/TANK CONFIGURATIONTEST NUMBER: OH3A TEST FACILITY: AEDC 8TEST DATE: 6-28-73 TEST ENGINEER: DL QUAN

Run No.	Model Configuration Identification	Model Scale	Free Stream Mach Number	Total Pressure (psia)	Total Temp. (°F)	Initial Temp. (°F)	RNX10 <sup>6</sup> Ft	Phase Change Temp. (°F)	OBS. Position (degrees)			TANK Position (deg)	
									$\alpha$	$\beta$	$\phi$	$\phi$	$\phi$
14	T	.0175	8	860	880	80	3.7	500	-5	0	-	180	
15	T					80		131			-		
16	T					82		300	0		-		
17	T					80		131			-		
18	OT					80		400			180	0	
19	OT					80		150				0	
20	O					80		200				-	
21	OT					81/81		350				180	
22	OT					81/81		150					
23	OT					81/81		350	-5				
24	O					85		131	0				
25	T					75		500			-	180	
26	OT					18/18		350				0	

\*\* X axis parallel to stream (+downstream, -upstream)

Y axis (+right, -left, as viewed from the rear)

Z axis (+up, -down)

\* T<sub>aw</sub> = adiabatic wall temperature

TABLE 3

## PHASE CHANGE COATING TEST DATA SUMMARY SHEET

TEST TITLE: PHASE CHANGE PAINT TESTS OF A ROCKWELL ORBITER/TANK CONFIGURATION

TEST NUMBER: OH3A TEST FACILITY: AEDC B

TEST DATE: 6-28-73 TEST ENGINEER: M. QUAN

Run No.	Model Configuration Identification	Model Scale	Free Stream Mach Number	Total Pressure (psia)	Total Temp. (°F)	Initial Temp. (°F)	RNX106 Ft	Phase Change Temp. (°F)	ORB. Position (degrees)			TANK POSITION (deg.)
									$\alpha$	$\beta$	$\phi$	
27	O	.0175	8	860	880	77	3.7	200	-5	0	180	-
28	OT (with trip ring) NOTE 1					80/80		350	0		180	180
29	OT					79/79		150			0	0
30	OT (with trip ring)					80/80		150			180	180
31	OT					80/80		150	-5			
32	OT (with trip ring)					80/80		250	0			0
33	OT					80/80		150	-5			
34	OT (with trip ring)					81/81		131	0		180	180
35	T (with trip ring)					81		200			-	180
36	T (with trip ring)					81		113				
SCH.	OT					-		-	0	0	$\phi = 0$	$\phi = 0, -45, -90, -135, -180$
SCH.	OT					-		-	-5	0	$\phi = 0$	$\phi = 0, -18$
SCH.	O					-		-	0	0	$\phi = 0$	$\phi = 0, -45, -90$

\*\* X axis parallel to stream (+downstream, -upstream)

Y axis (+right, -left, as viewed from the rear)

Z axis (+up, -down)

\* Taw = adiabatic wall temperature

NOTE 1: RUN U.G. TRIP RING BLEW OFF

TEST DATE: 6-28 → 6-30-73 TEST ENGINEER: M. QUAN

[illegible]

\*\* X axis parallel to stream (+downstream, - upstream)  
Y axis (+right, - left) or viewed from above

Y axis (+ right, - left, as viewed from the rear)

Z axis (↑ up, ↓ down)



77 2114

## PHASE CHANGE COATING TEST DATA SUMMARY SHEET

TEST TITLE: PHASE CHANGE PAINT TESTS OF A ROCKWELL -139 ORBITERTEST NUMBER: CH3B TEST FACILITY: AEDC BTEST DATE: 7-9 → 7-11-73 TEST ENGINEER: M. QUAN

Run No.	Model Configuration Identification	Model Scale	Free Stream Mach Number	Total Pressure (psia)	Total Temp. (°F)	Initial Temp. (°F)	RNX10 <sup>6</sup> Ft	Phase Change Temp. (°F)	ORB. Position (degrees)		
									$\alpha$	$\beta$	$\phi$
37	S-28	.0175	8	110	790	78	.5	200	30	0	0
38	S-27					78		113			
39	R <sub>3</sub>					78		131		↓	
40	S-28					78		131		-5	
41	S-22x					78		131		0	
42	R <sub>3</sub>					78		200			
43	E					78		150		↓	
44	S-28					80		131		-1	
45	R <sub>4</sub>					80		250		0	
46	E					79		113			
47	R <sub>2</sub>					78		200		↓	
48	S-22x					78		200		35	
49	R <sub>3</sub>					78		200		↓	

\*\* X axis parallel to stream (+downstream, -upstream)

Y axis (+right, -left, as viewed from the rear)

Z axis (+up, -down)

\* T<sub>aw</sub> = adiabatic wall temperature

TABLE 4  
PHASE CHANGE COATING TEST DATA SUMMARY SHEET

TEST TITLE: PHASE CHANGE PAINT TESTS OF A ROCKWELL -139 ORBITER

TEST NUMBER: 043B TEST FACILITY: AEDC B

TEST DATE: 7-9 → 7-11-73 TEST ENGINEER: M. QUAN

Run No.	Model Configuration Identification	Model Scale	Free Stream Mach Number	Total Pressure (psia)	Total Temp. (°F)	Initial Temp. (°F)	RNX10 <sup>6</sup> Ft	Phase Change Temp. (°F)	ORB. Position (degrees)		
									$\alpha$	$\beta$	$\phi$
50	S-27	.0175	8	110	790	78	.5	113	35	0	0
51	R <sub>2</sub>					80		200			
52	S-28					80		150		-5	
53	E					79		175		0	
54	S-27					79		150		-1	
55	R <sub>3</sub> (NOTE 3)					79		250	45	0	
56	S-28					79		250			
57	S-27					80		113			
58	E					78		225			
59	S-28					80		113		-1	
60	R <sub>3</sub>					80		250		0	
61	R <sub>2</sub>					79		250			
62	S-28					79		150	25		

\*\* X axis parallel to stream (+downstream, -upstream)  
Y axis (+right, -left, as viewed from the rear)  
Z axis (+up, -down)

\* T<sub>aw</sub> = adiabatic wall temperature

NOTE 3: CAMERA MALFUNCTION - WILL RE-RUN

# TABLE A

## PHASE CHANGE COATING TEST DATA SUMMARY SHEET

TEST TITLE: PHASE CHANGE PAINT TESTS OF A ROCKWELL -139 ORBITER

TEST NUMBER: CH 3B TEST FACILITY: AEDC B

TEST DATE: 7-9-73 TEST ENGINEER: M. QUAN

Run No.	Model Configuration Identification	Model Scale	Free Stream Mach Number	Total Pressure (psia)	Total Temp. (°F)	Initial Temp. (°F)	RNX10 <sup>6</sup> Ft	Phase Change Temp. (°F)	ORB. Position (degrees)		
									$\alpha$	$\beta$	$\phi$
63	E	.0175	8	110	790	80	.5	150	25	0	0
64	S-27					79		113			
65	S-28					80		113			
66	R <sub>2</sub>			210	810	80	1.0	300	30	0	
67	S-27					80		300			
68	R <sub>1</sub>					80		250			
69	S-28					80		131			
70	R <sub>3</sub>					81		300			
71	R <sub>2</sub>					81		175			
72	E					79		200			
73	R <sub>4</sub>					78		300			
74	R <sub>2</sub>					78		175	25		
75	S-28					80		169			

\* X axis parallel to stream (+downstream, -upstream)

Y axis (+right, -left, as viewed from the rear)

Z axis (+up, -down)

\* T<sub>aw</sub> = adiabatic wall temperature

# PHASE CHANGE COATING TEST DATA SUMMARY SHEET

TEST TITLE: PHASE CHANGE PAINT TESTS OF A ROCKWELL -139 ORBITER

TEST NUMBER: OH3B TEST FACILITY: AEDC B

TEST DATE: 7-9 → 7-11-73 TEST ENGINEER: M. QUAN

Run No.	Model Configuration Identification	Model Scale	Free Stream Mach Number	Total Pressure (psia)	Total Temp. (°F)	Initial Temp. (°F)	RNX10 <sup>6</sup> Ft	Phase Change Temp. (°F)	ORB. Position (degrees)		
									α	β	φ
76	S-27	.0175	8	210	810	80	1.0	113	25	0	0
77	R <sub>3</sub>					80		200	✓		
78	S-28					81		250	35		
79	R <sub>5</sub>					81		200	30		
80	R <sub>3</sub>					77		250	35		
81	S-28					77		131			
82	R <sub>4</sub>					77		250	✓		
83	R <sub>3</sub>					80		200	30		
84	R <sub>1</sub>					78		250	35		
85	S-27					77		300	45		
86	R <sub>3</sub>					84		200			
87	R <sub>1</sub>					78		250			
88	S-27	✓	✓	✓	✓	80	✓	131	✓	✓	✓

\*\* X axis parallel to stream (+downstream, -upstream)

Y axis (+right, -left, as viewed from the rear)

Z axis (+up, -down)

\* T<sub>aw</sub> = adiabatic wall temperature

TIN 4

PHASE CHANGE COATING TEST DATA SUMMARY SHEET

TEST TITLE: PHASE CHANGE PAINT TESTS OF A ROCKWELL -139 ORBITER

TEST NUMBER: OH3B TEST FACILITY: AEDC B

TEST DATE: 7-9-73 TEST ENGINEER: M. QUAN

Run No.	Model Configuration Identification	Model Scale	Free Stream Mach Number	Total Pressure (psia)	Total Temp. (°F)	Initial Temp. (°F)	RNX106 Ft	Phase Change Temp. (°F)	Obs. Position (degrees)		
									$\alpha$	$\beta$	$\phi$
89	R <sub>4</sub>	0.175	8	210	810	79	1.0	300	45	0	0
90	S-28			425	830	79	2.0	300	30		
91	R <sub>1</sub>					80		300			
92	S-27					80		150			
93	R <sub>5</sub>					78		250			
94	S-22x					77		250			
95	E					78		350			
96	R <sub>4</sub>					80		350			
97	S-28					80		250			
98	R <sub>3</sub>					80		300			
99	R <sub>2</sub>					80		300	✓		
100	S-28 NOTE 4					81		250	35		
101	R <sub>3</sub> NOTE 5		✓	✓	✓	80	✓	200	30	✓	✓

\* T<sub>aw</sub> = adiabatic wall temperature

\*\* X axis parallel to stream (+downstream, -upstream)  
Y axis (+right, -left, as viewed from the rear)  
Z axis (+up, -down)

NOTE 4: TOP CAMERA MALFUNCTION - WILL RE-RUN

NOTE 5: PAINT MAY NOT HAVE BEEN T<sub>pc</sub> = 200°F

# PHASE CHANGE COATING TEST DATA SUMMARY SHEET

TEST TITLE: PHASE CHANGE PAINT TESTS OF A ROCKWELL -139 ORBITER

TEST NUMBER: 0438 TEST FACILITY: AEDC B

TEST DATE: 7-9-73 TEST ENGINEER: M. QUAN

Run No.	Model Configuration Identification	Model Scale	Free Stream Mach Number	Total Pressure (psia)	Total Temp. (°F)	Initial Temp. (°F)	RNX106 Ft	Phase Change Temp. (°F)	Obs. Position (degrees)		
									$\alpha$	$\beta$	$\phi$
102	S-27	0175	8	425	830	80	2.0	150	35	0	0
103	R <sub>1</sub>					80		250			
104	R <sub>4</sub>					80		350			
105	E					79		400			
106	R <sub>3</sub>					81		300			
107	S-28					80		250			
108	R <sub>2</sub>					79		250			
109	R <sub>3</sub>					80		250	30		
110	S-28					81		300	45		
111	R <sub>2</sub>					80		200	25		
112	S-27					80		200			
113	S-28					81		113			
114	R <sub>3</sub>					31		250			

\*\* X axis parallel to stream (+ downstream, - upstream)

Y axis (+ right, - left, as viewed from the rear)

Z axis (+ up, - down)

\* Taw = adiabatic wall temperature

PHASE CHANGE COATING TEST DATA SUMMARY SHEET

TEST TITLE: PHASE CHANGE PAINT TESTS OF A ROCKWELL -139 ORBITER

TEST NUMBER: 0438 TEST FACILITY: AEDC B

TEST DATE: 7-9-73 TEST ENGINEER: M. QUAN

Run No.	Model Configuration Identification	Model Scale	Free Stream Mach Number	Total Pressure (psia)	Total Temp. (°F)	Initial Temp. (°F)	RNX106 Ft	Phase Change Temp. (°F)	ORB. Position (degrees)		
									$\alpha$	$\beta$	$\phi$
115	R <sub>1</sub>	.0175	8	425	830	80	2.0	225	25	0	0
116	E					80		300			
117	R <sub>3</sub>					82		200	30		
118	S-28			600	860	82	2.75	250			
119	R <sub>2</sub>					81		300			
120	R <sub>4</sub>					80		350			
121	R <sub>1</sub>					80		250			
122	S-22x					79		250			
123	R <sub>3</sub>					81		300			
124	S-27					80		131			
125	S-28					80		250	35		
126	R <sub>2</sub>					80		250			
127	E					80		400	30		

\*\* X axis parallel to stream (+ downstream, - upstream)

Y axis (+ right, - left, as viewed from the rear)

Z axis (+ up, - down)

\* T<sub>aw</sub> = adiabatic wall temperature

PHASE CHANGE COATING TEST DATA SUMMARY SHEET

TEST TITLE: PHASE CHANGE PAINT TESTS OF A ROCKWELL -139 ORBITER

TEST NUMBER: QH 3B TEST FACILITY: AEDC B

TEST DATE: 7-9-73 TEST ENGINEER: M. QUAN

Run No.	Model Configuration Identification	Model Scale	Free Stream Mach Number	Total Pressure (psia)	Total Temp. (°F)	Initial Temp. (°F)	RNX10 <sup>6</sup> Ft	Phase Change Temp. (°F)	ORB. Position (degrees)		
									$\alpha$	$\theta$	$\phi$
128	R <sub>1</sub>	0.175	8	600	860	80	2.75	250	35	0	0
129	S-27					80		131			
130	R <sub>3</sub>					80		400			
131	E					82		450			
132	S-28			490	840	78	2.2	250	30		
133	S-27					77		131			
134	R <sub>1</sub>					78		250			
135	R <sub>2</sub>					78		250			
136	S-27			600	860	80	2.75	200	25		
137	S-28					80		113			
138	R <sub>1</sub>					80		200			
139	R <sub>2</sub>					79		250			
140	R <sub>3</sub>					78		250			

\*\* X axis parallel to stream (+ downstream, - upstream)

Y axis (+ right, - left, as viewed from the rear)

Z axis (+ up, - down)

\* T<sub>aw</sub> = adiabatic wall temperature



# PHASE CHANGE COATING TEST DATA SUMMARY SHEET

TEST TITLE: PHASE CHANGE PAINT TESTS OF A ROCKWELL -139 ORBITER

TEST NUMBER: 0438 TEST FACILITY: AEDC 8

TEST DATE: 7-9-73 TEST ENGINEER: M. QUAN

Run No.	Model Configuration Identification	Model Scale	Fre Stream Mach Number	Total Pressure (psia)	Total Temp. (°F)	Initial Temp. (°F)	RNX10 <sup>6</sup> Ft	Phase Change Temp. (°F)	Obs. Position (degrees)		
									$\alpha$	$\beta$	$\phi$
141	S-28 NOTE 6	.0175	8	360	890	80	3.7	400	30	0	0
142	S-27 NOTE 6					80		150			
143	S-22x					78		150			
144	R <sub>1</sub>					79		350		0	
145	R <sub>2</sub>					79		350			
146	S-28					81		150		5	
147	E					78		500		0	
148	S-27					80		350		35	
149	S-28					81		131			
150	R <sub>1</sub>					80		350			
151	S-27					81		150			
152	R <sub>2</sub>					80		400		0	
153	S-22x					80		150		5	

\*\* X axis parallel to stream (+downstream, -upstream)

Y axis (+right, -left, as viewed from the rear)

Z axis (+up, -down)

\* T<sub>aw</sub> = adiabatic wall temperature

NOTE 6: CAMERA MALFUNCTION, WILL RE-RUN

# PHASE CHANGE COATING TEST DATA SUMMARY SHEET

TEST TITLE: PHASE CHANGE PAINT TESTS OF A ROCKWELL -139 ORBITER

TEST NUMBER: OH3B TEST FACILITY: AEDC B

TEST DATE: 7-9-73 TEST ENGINEER: M. QUAN

Run No.	Model Configuration Identification	Model Scale	Free Stream Mach Number	Total Pressure (psia)	Total Temp. (°F)	Initial Temp. (°F)	RNX106 Ft	Phase Change Temp. (°F)	Obs. Position (degrees)		
									$\alpha$	$\beta$	$\phi$
154	S-27	.0175	8	860	890	82	3.7	300	30	0	0
155	S-22x					82		113			
156	E					79		131			
157	S-27			545	845	83	2.5	250			
158	R <sub>1</sub>					80		250			
159	S-22x			425	830	81	2.0	113			
160	S-28					80		113			
161	S-27					80		113	35		
162	S-22x					82		113			
163	S-28					82		131	30	5	
164	S-27					81		131	35	5	
165	R <sub>1</sub> (OIL FLOW)			210	810	-	1.0	-	30	0	
166	S-22x (OIL FLOW)					-		-	30	0	

\*\* X axis parallel to stream (+ downstream, - upstream)

Y axis (+ right, - left, as viewed from the rear)

Z axis (+ up, - down)

\* T<sub>aw</sub> = adiabatic wall temperature

PHASE CHANGE COATING TEST DATA SUMMARY SHEET

TEST TITLE: PHASE CHANGE PAINT TESTS OF A LOCKWELL -139 ORBITER

TEST NUMBER: OH3B TEST FACILITY: AEC E

TEST DATE: 7-9 → 7-11-73 TEST ENGINEER: M. QUAN

Run No.	Model Configuration Identification	Model Scale	Free Stream Mach Number	Total Pressure (psia)	Total Temp. (°F)	RNX106 Ft	Phase Change Temp. (°F)	ORB. Position (degrees)		SECTOR STING ROTATION (deg.)
								$\alpha$	$\phi$	
167	R <sub>2</sub> (OIL FLOW)	.0175	8	210	810	1.0	-	30	0	0
168	Model 46-1 (-139 orbiter)	.006								-90
169										0
170										-15
171										-30
172										-45
173										-60
174										-75
175										-90
176	Model 46-2 (-139 Mod-1)									-90
177										-90
178										-90
179										-90

\* T<sub>aw</sub> = adiabatic wall temperature

\*\* X axis parallel to stream (+downstream, -upstream)

Y axis (+right, -left, as viewed from the rear)

Z axis (+up, -down)

PHASE CHANGE COATING TEST DATA SUMMARY SHEET

TEST TITLE: PHASE CHANGE PAINT TESTS OF A ROCKWELL -139 ORBITER

TEST NUMBER: 043B TEST FACILITY: AEDC B

TEST DATE: 7-9 → 7-11-73 TEST ENGINEER: M. QUAN

Run No.	Model Configuration Identification	Model Scale	Free Stream Mach Number	Total Pressure (psia)	Total Temp. (°F)	Initial Temp. (°F)	RNK106 Ft	Phase Change Temp. (°F)	Obs. Position (degrees)			Sector Station Location (deg.)
									α	β	φ	
180	Model 46-2 (-139 Modified)	.006	8	210	810	SCHLIEREN	1.0	-	30	0	0	-30
181												-45
182												-60
183												-75
184												-90
185										15		0
186										45		
187	↓					SHALOW- SPRAY		↓	30			
188	Model 46-2 (-139 Modified)					-		150				
189	↓					79		225				
190	Model 46-1 (-139 Orfiter)	↓				79		175				↓
191	S-22x	.0175	↓	↓	↓	SCHLIEREN	↓	-	↓	↓	↓	90

**\*\* X axis parallel to stream (+downstream, -upstream)**

Y axis (+ right, - left, as viewed from the rear)

Z axis (+up, -down)

\*  $T_{aw}$  = adiabatic wall temperature

DATA FIGURES

Group 139  
8537  
MD

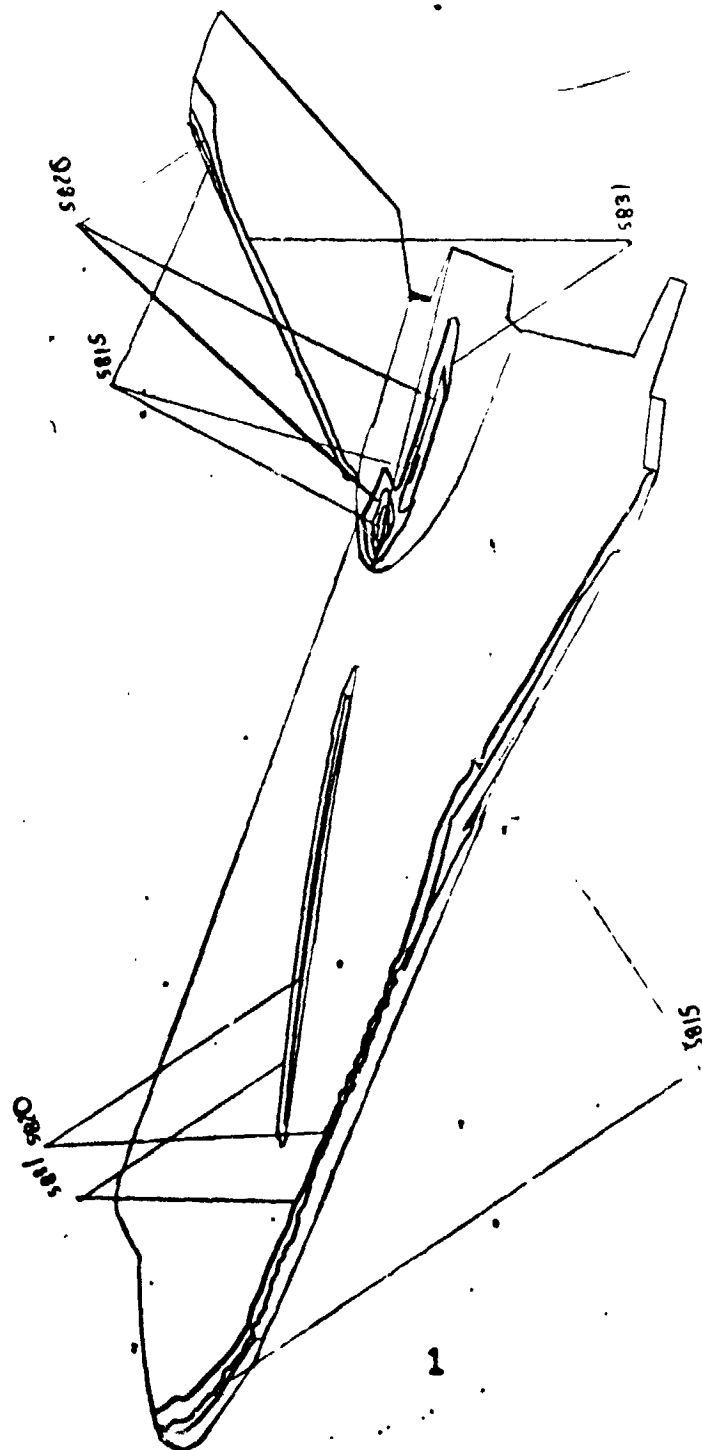
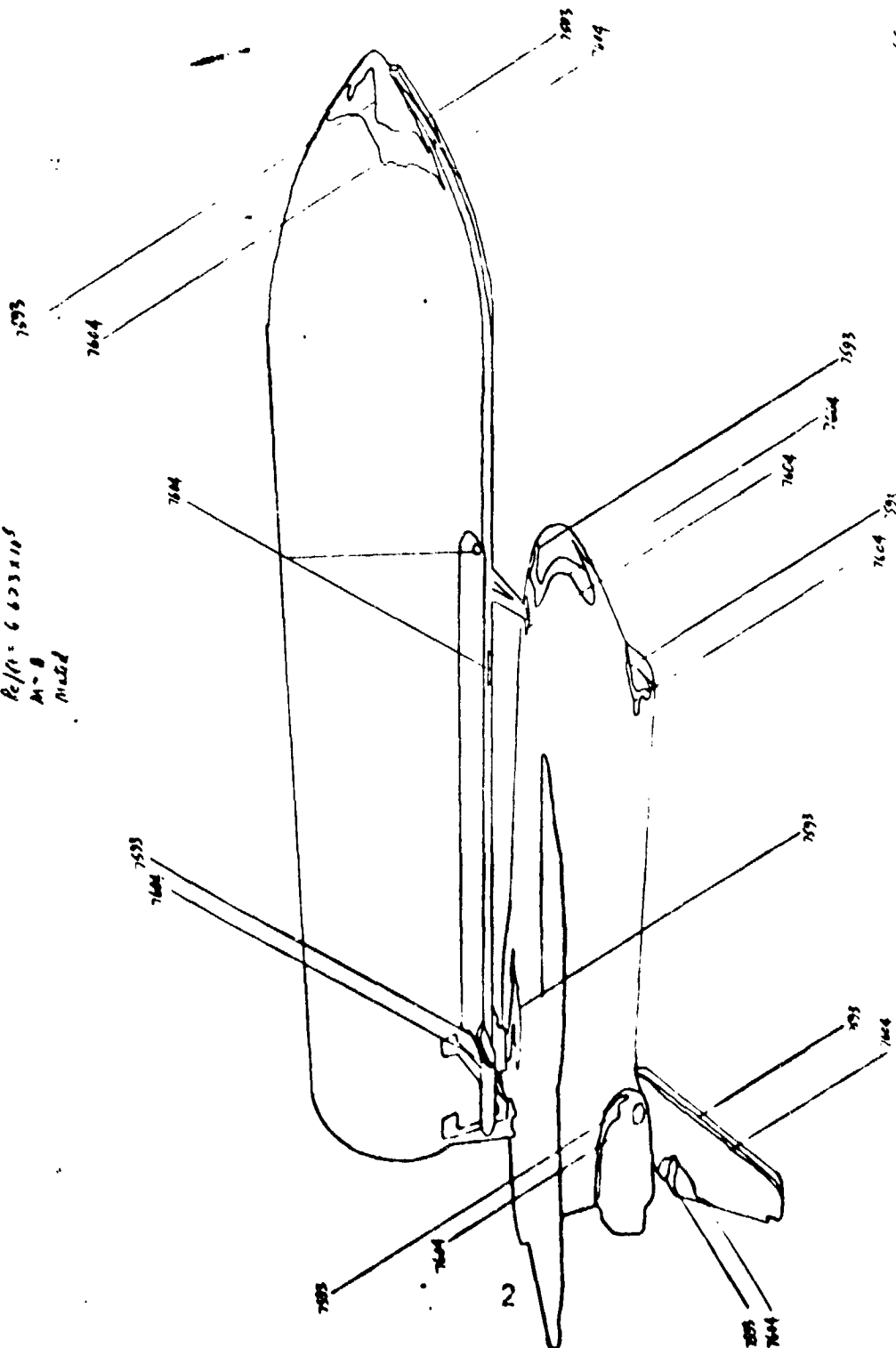
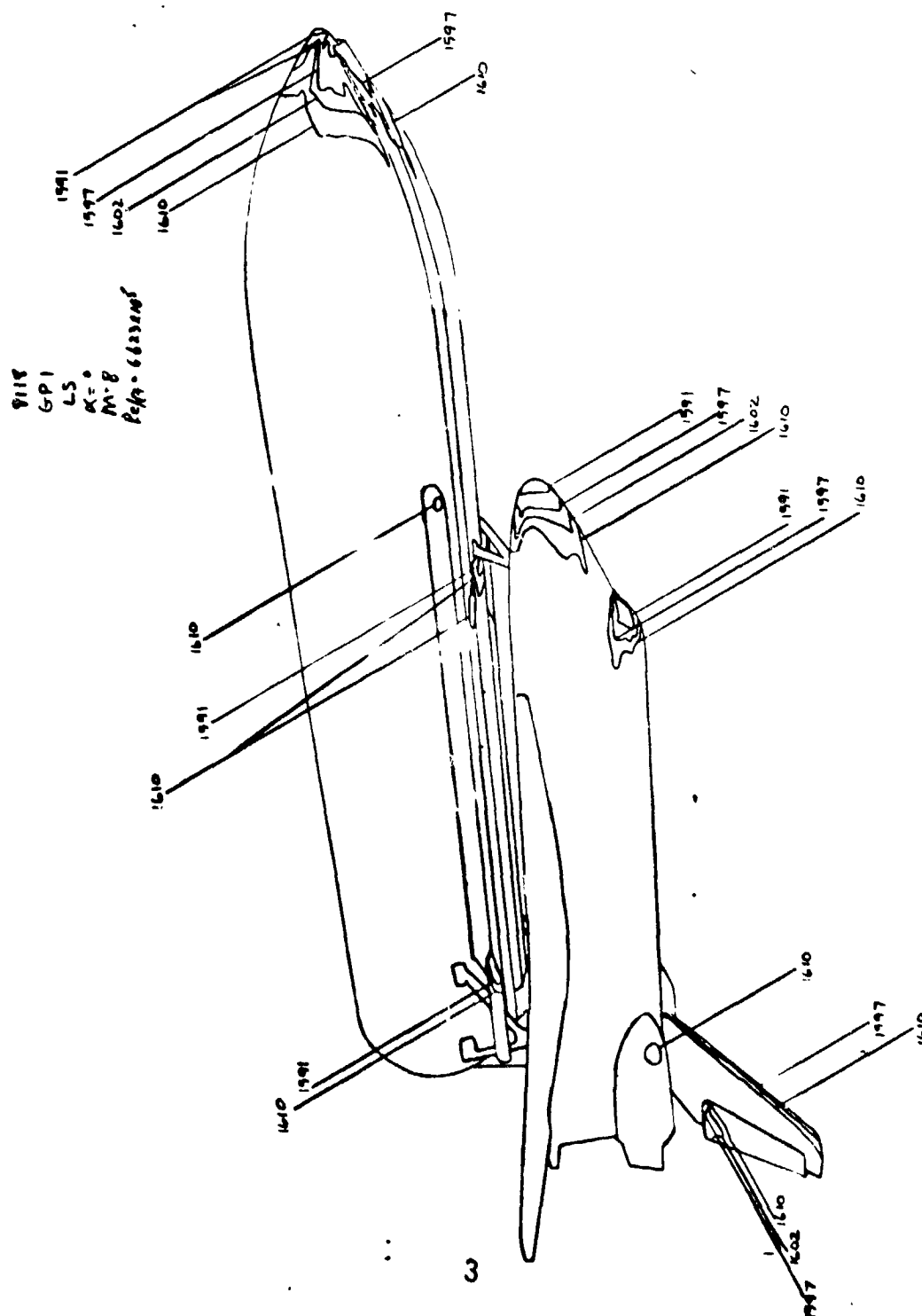


Figure 190

6075 Cap 1  
 US  
 W=C  
 Ref: 66231105  
 M-B  
 Mated



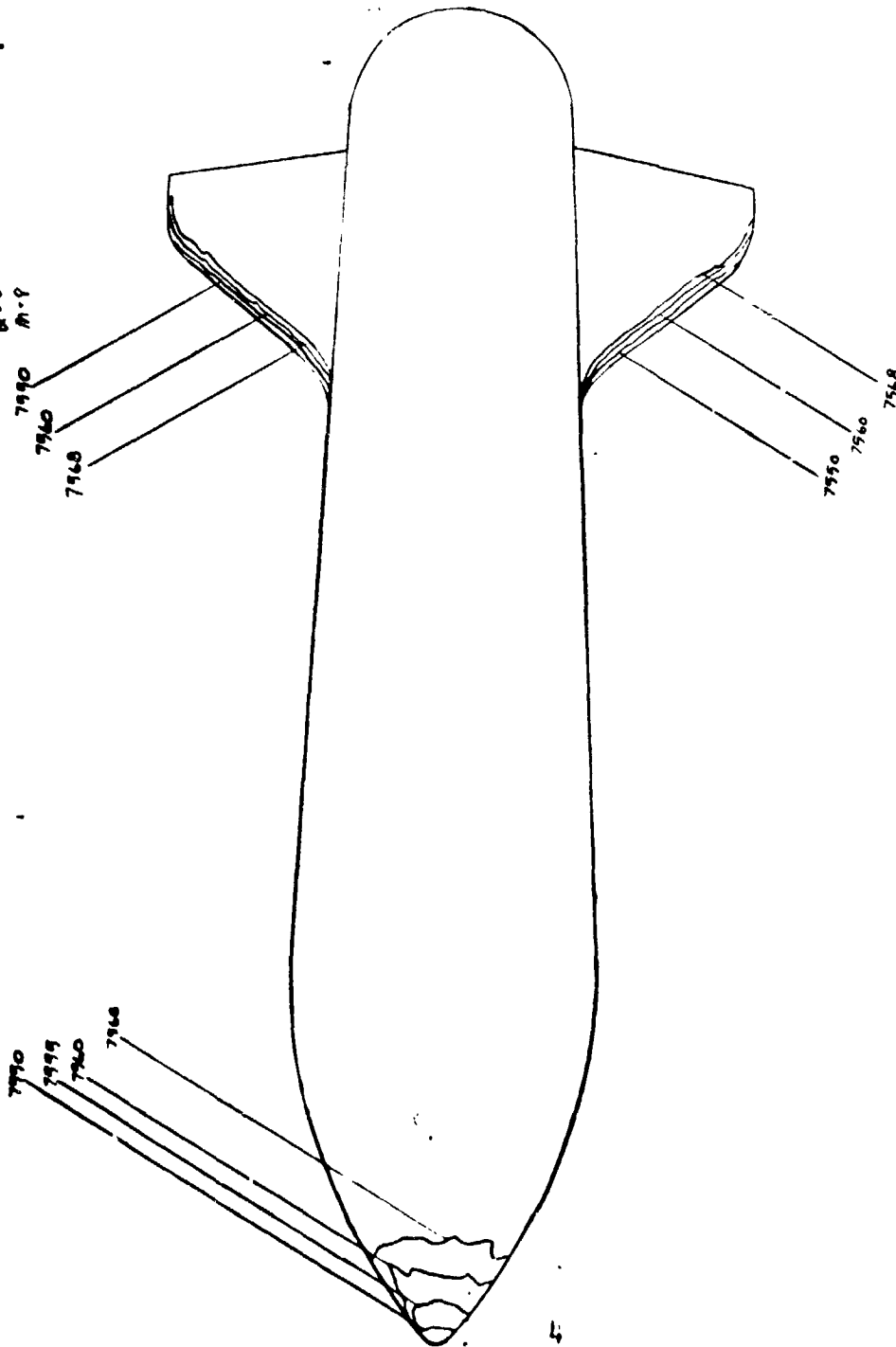
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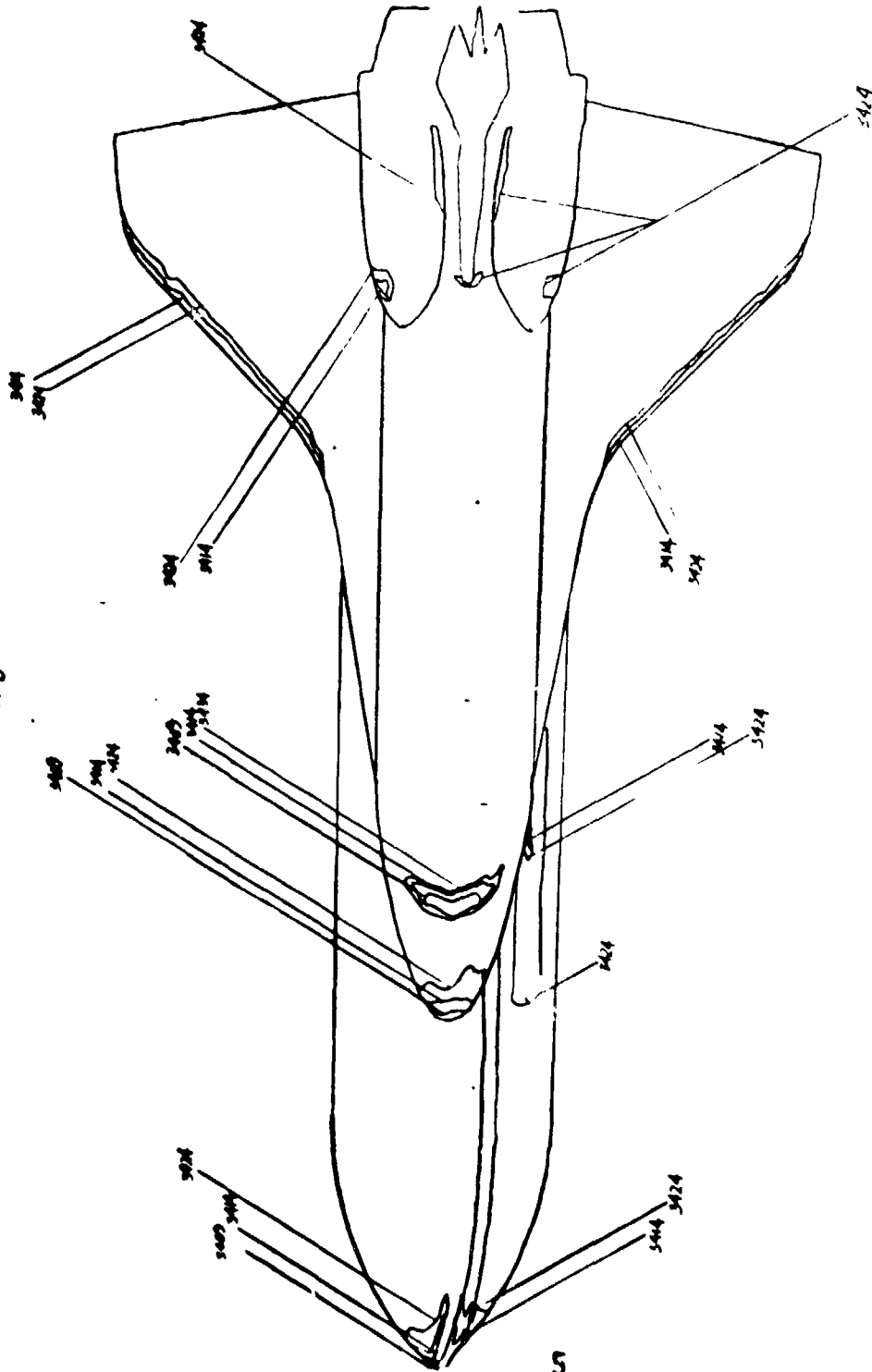
9373  
CPI Ref - 6 623 2105

Top  
d=0  
M-9



M2

7983 GP 1  
B  
x=0  
Ref=6.629x10<sup>5</sup>  
h=8



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6/28/73

NASA-MI ORRITER PEATING

VA249

AEDC(ARO, INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL R

GROUP	CONFIG	MODEL	MACH NO	PO(PSIA)	TO(DEG R)	ALPHA-MODEL	ALPHA-SECTOR	ALPHA-PREBEND	ROLL-MODEL	YAW
1	1	MATED	7.96	126.3	1198	.02	-.02	0	180.00	.00
T-1AF	P-1NF	Q-1NF	V-1NF	RHO-1NF	MU-1NF	RE/FT	HREF	STREF		
(DEG M)	(PSIA)	(PSIA)	(FT/SEC)	(SLUGS/FT <sup>3</sup> )	(LB-SEC/FT <sup>2</sup> )	(FT-1)	(R= .0175FT)	(R= .0175FT)		
87.6	.013	.593	3651	1.290E-05	7.054E-08	6.623E 05	1.864E-02	5.052E-02		
CAMFPA	HOLL NO	PAINT TEMP (DEG F)	INITIAL TEMP (DEG F)	SQUARE ROOT (RHOXCKX)	TRAR(TO)	BETA(TO)				
TOM(T)	8373									
UPPER SIDE(US)	8075									
LOWER SIDE(LS)	8114									
NOTTCM(R)	7583									

PIC NO	TIME DELTIME	HIT(O)	HIT(O)/HREF	H(.9TO)	H(.9TO)/HREF	H(.85TO)	H(.85TO)/HREF	ST(TO)
T 7545(250)	1.15	MODEL HAS NOT REACHED CENTERLINE	1.501E-02	.9049	1.771E-02	1.771E-02	1.771E-02	3.072E-02
M 3403(250)	1.15	MODEL HAS NOT REACHED CENTERLINE	1.501E-02	.9049	1.771E-02	1.771E-02	1.771E-02	3.072E-02
LS 1587(250)	1.15	MODEL HAS NOT REACHED CENTERLINE	1.501E-02	.9049	1.771E-02	1.771E-02	1.771E-02	3.072E-02
US 7541(250)	1.18	MODEL HAS NOT REACHED CENTERLINE	1.501E-02	.9049	1.771E-02	1.771E-02	1.771E-02	3.072E-02
T 7546(250)	2.23	MODEL HAS NOT REACHED CENTERLINE	1.501E-02	.9049	1.771E-02	1.771E-02	1.771E-02	3.072E-02
M 7404(250)	2.23	MODEL HAS NOT REACHED CENTERLINE	1.501E-02	.9049	1.771E-02	1.771E-02	1.771E-02	3.072E-02
LS 1588(250)	2.23	MODEL HAS NOT REACHED CENTERLINE	1.501E-02	.9049	1.771E-02	1.771E-02	1.771E-02	3.072E-02
US 7542(250)	2.25	MODEL HAS NOT REACHED CENTERLINE	1.501E-02	.9049	1.771E-02	1.771E-02	1.771E-02	3.072E-02
INJECT TIME = 7.65								
T 7547(250)	3.20	1.511E-02	.6175	.9049	1.771E-02	1.771E-02	1.771E-02	3.072E-02
M 3405(250)	3.20	1.511E-02	.6175	.9049	1.771E-02	1.771E-02	1.771E-02	3.072E-02
LS 1589(250)	3.20	1.511E-02	.6175	.9049	1.771E-02	1.771E-02	1.771E-02	3.072E-02
US 7543(250)	3.23	1.511E-02	.6175	.9049	1.771E-02	1.771E-02	1.771E-02	3.072E-02
T 7548(250)	4.36	1.511E-02	.6175	.9049	1.771E-02	1.771E-02	1.771E-02	3.072E-02
M 3406(250)	4.36	1.511E-02	.6175	.9049	1.771E-02	1.771E-02	1.771E-02	3.072E-02
LS 1590(250)	4.38	1.511E-02	.6175	.9049	1.771E-02	1.771E-02	1.771E-02	3.072E-02
US 7549(250)	4.38	1.511E-02	.6175	.9049	1.771E-02	1.771E-02	1.771E-02	3.072E-02
T 7550(250)	5.43	1.511E-02	.6175	.9049	1.771E-02	1.771E-02	1.771E-02	3.072E-02
M 3407(250)	5.43	1.511E-02	.6175	.9049	1.771E-02	1.771E-02	1.771E-02	3.072E-02
LS 1591(250)	5.46	1.511E-02	.6175	.9049	1.771E-02	1.771E-02	1.771E-02	3.072E-02
US 7551(250)	5.46	1.511E-02	.6175	.9049	1.771E-02	1.771E-02	1.771E-02	3.072E-02
T 7552(250)	5.48	1.511E-02	.6175	.9049	1.771E-02	1.771E-02	1.771E-02	3.072E-02
M 3408(250)	5.48	1.511E-02	.6175	.9049	1.771E-02	1.771E-02	1.771E-02	3.072E-02
LS 1592(250)	6.53	1.511E-02	.6175	.9049	1.771E-02	1.771E-02	1.771E-02	3.072E-02
US 7553(250)	6.53	1.511E-02	.6175	.9049	1.771E-02	1.771E-02	1.771E-02	3.072E-02
T 7554(250)	6.53	1.511E-02	.6175	.9049	1.771E-02	1.771E-02	1.771E-02	3.072E-02
M 3409(250)	6.53	1.511E-02	.6175	.9049	1.771E-02	1.771E-02	1.771E-02	3.072E-02
LS 1593(250)	6.56	1.511E-02	.6175	.9049	1.771E-02	1.771E-02	1.771E-02	3.072E-02
US 7555(250)	6.56	1.511E-02	.6175	.9049	1.771E-02	1.771E-02	1.771E-02	3.072E-02
T 7556(250)	7.61	1.511E-02	.6175	.9049	1.771E-02	1.771E-02	1.771E-02	3.072E-02
M 3410(250)	7.61	1.511E-02	.6175	.9049	1.771E-02	1.771E-02	1.771E-02	3.072E-02
LS 1594(250)	7.61	1.511E-02	.6175	.9049	1.771E-02	1.771E-02	1.771E-02	3.072E-02
US 7557(250)	7.61	1.511E-02	.6175	.9049	1.771E-02	1.771E-02	1.771E-02	3.072E-02
T 7558(250)	7.61	1.511E-02	.6175	.9049	1.771E-02	1.771E-02	1.771E-02	3.072E-02
M 3411(250)	7.61	1.511E-02	.6175	.9049	1.771E-02	1.771E-02	1.771E-02	3.072E-02
LS 1595(250)	7.61	1.511E-02	.6175	.9049	1.771E-02	1.771E-02	1.771E-02	3.072E-02
US 7559(250)	7.61	1.511E-02	.6175	.9049	1.771E-02	1.771E-02	1.771E-02	3.072E-02

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6/28/73

AEDC(ARO,INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL A

NASA-81 ORBITER HEATING

VA249

GROUP	COMPID	MODEL	MACH NO	PO(PSIA)	TO(EG R)	ALPHA-MODEL	ALPHA-SECTION	ALPHA-PREBEND	ROLL-MODEL	YAW
1	1	MAYED	7.96	126.3	1198	.02	-.02	0	100.00	.00
T-IMP P-IMP Q-IMP V-IMP MU-IMP RU-IMP RF/FT MREF STREF (DEG R) (PSIA) (FT/SFC) (SLUGS/FT <sup>3</sup> ) (LB-SEC/FT <sup>2</sup> ) (FT-1) (IN-.0175FT) (IN-.0175FT) BT.6 .073 .503 .3651 1.2786E-05 7.054E-08 6.423E 05 1.444E-02 5.052E-02										
CAMERA ROLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHQACAK) TRAR(10) BETAI(10)										
TOP(1) 8373 60 .0535 2.584E-01 2.0985E-01										
UPPER SIDE(US) 8075										
LOWER SIDE(LS) 8118										
BOTTOM(BT) 7803										

PIC NO	TIME DELTME	H(10)	H(10)/HREF	M(.910)	M(.910)/HREF	M(.8510)	M(.8510)/HREF	ST(10)
T 7552(250)	8.68	7.24	5.781E-03	.3101	7.535E-03	.4042	8.091E-03	1.543E-02
M 3410(250)	8.68	7.24	5.741E-03	.3101	7.535E-03	.4042	8.091E-03	1.543E-02
LS 1596(250)	8.68	7.24	5.741E-03	.3101	7.535E-03	.4042	8.091E-03	1.543E-02
US 7493(250)	8.71	7.22	5.392E-03	.2892	7.028E-03	.3770	8.292E-03	1.439E-02
T 7453(250)	9.76	8.27	5.392E-03	.2892	7.028E-03	.3770	8.292E-03	1.439E-02
M 3411(250)	9.76	8.27	5.392E-03	.2892	7.028E-03	.3770	8.292E-03	1.439E-02
LS 1595(250)	9.76	8.27	5.392E-03	.2892	7.028E-03	.3770	8.292E-03	1.439E-02
US 7494(250)	9.79	8.34	5.392E-03	.2892	7.028E-03	.3770	8.292E-03	1.439E-02
T 7554(250)	10.84	9.35	5.072E-03	.2721	6.611E-03	.3546	7.800E-03	1.354E-02
M 3412(250)	10.84	9.35	5.072E-03	.2721	6.611E-03	.3546	7.800E-03	1.354E-02
LS 1596(250)	10.84	9.35	5.072E-03	.2721	6.611E-03	.3546	7.800E-03	1.354E-02
US 7490(250)	10.86	9.37	5.065E-03	.2717	6.602E-03	.3541	7.790E-03	1.352E-02
T 7555(250)	11.51	10.42	4.803E-03	.2574	6.260E-03	.3358	7.387E-03	1.282E-02
M 3413(250)	11.51	10.42	4.803E-03	.2574	6.260E-03	.3358	7.387E-03	1.282E-02
LS 1597(250)	11.51	10.42	4.803E-03	.2574	6.260E-03	.3358	7.387E-03	1.282E-02
US 7491(250)	11.54	10.45	4.747E-03	.2573	6.253E-03	.3354	7.374E-03	1.280E-02
T 7556(250)	12.59	11.50	4.573E-03	.2453	5.960E-03	.3197	7.033E-03	1.220E-02
M 3414(250)	12.59	11.50	4.573E-03	.2453	5.960E-03	.3197	7.033E-03	1.220E-02
LS 1598(250)	12.59	11.50	4.573E-03	.2453	5.960E-03	.3197	7.033E-03	1.220E-02
US 7492(250)	13.01	11.53	4.568E-03	.2450	5.954E-03	.3194	7.025E-03	1.219E-02
T 7557(250)	14.07	12.58	4.373E-03	.2345	5.699E-03	.3057	6.725E-03	1.167E-02
M 3415(250)	14.07	12.58	4.373E-03	.2345	5.699E-03	.3057	6.725E-03	1.167E-02
LS 1599(250)	14.07	12.58	4.373E-03	.2345	5.699E-03	.3057	6.725E-03	1.167E-02
US 7493(250)	14.09	12.60	4.369E-03	.2343	5.694E-03	.3054	6.714E-03	1.166E-02
T 7558(250)	15.14	13.62	4.147E-03	.2251	5.470E-03	.2934	6.454E-03	1.120E-02
M 3416(250)	15.14	13.65	4.147E-03	.2251	5.470E-03	.2934	6.454E-03	1.120E-02
LS 1600(250)	15.14	13.65	4.147E-03	.2251	5.470E-03	.2934	6.454E-03	1.120E-02

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6/28/73

# NASA-R1 ORBITER PEATING

AEDC(ARO, INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL #

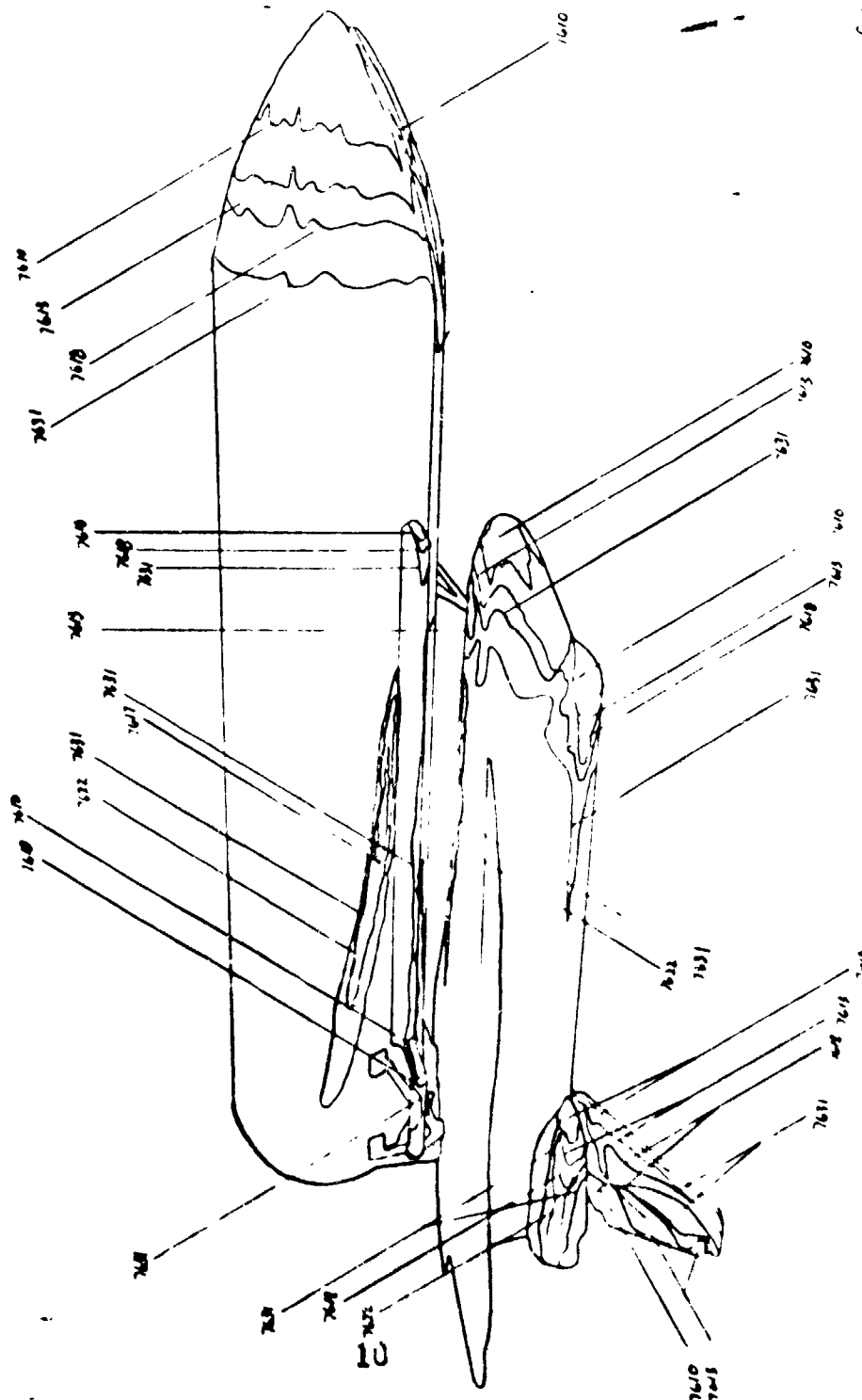
VA289

GROUP	COMP-16	MODEL	MACH NO	PO(P(SIA)	TO( DEG R)	ALPHA-MODEL	ALPHA-SECTOR	ALPHA-PREBEND	ROLL-MODEL	YAW
1	1	MATED	7.96	126.3	1190	.02	-.02	0	100.00	.00
1-INF	0-INF	0-INF	V-INF	MMO-INF	MM-INF	ME/FT	MREF	STREF		
NOG R	(PSIA)	(FT/SFC)	(FT/SFC)	(SLUGS/FT3)	(LB-SEC/FT2)	(FT-1)	(R= .0175FT)	(R= .0175FT)		
87.8	.913	.593	3651	1.288E-05	7.054E-06	0.223E 05	1.866E-02	5.522E-02		
CAMERA	ROLL NO	PAINT TEMP (DEG F)	INITIAL TEMP (DEG F)	SQUARE ROOT (MM/ACK)	TBAR(ITO)	BETA(ITO)				
TOP (T)	8373		80	.0535	2.504E-01	2.0985E-01				
UPPER SINE(US)	8075	250								
LOWER SINE(LS)	8110									
NOTCH(MB)	7603									

PIC NO	TIME DELTIME	H(TO)	H(TO)/HREF	H(.9TO)	H(.9TO)/HREF	H(.05TO)	H(.05TO)/HREF	ST(ITO)
Y 7665(250)	23.58	3.270E-03	.1754	4.262E-03	.2286	5.029E-03	.2698	8.727E-03
M 7423(250)	23.58	3.270E-03	.1754	4.262E-03	.2286	5.029E-03	.2698	8.727E-03
LS 1607(250)	23.58	3.270E-03	.1754	4.262E-03	.2286	5.029E-03	.2698	8.727E-03
US 7491(250)	24.00	3.268E-03	.1753	4.260E-03	.2285	5.026E-03	.2696	8.722E-03
Y 7666(250)	26.05	3.129E-03	.1678	4.078E-03	.2187	4.812E-03	.2581	8.350E-03
M 7424(250)	26.05	3.129E-03	.1678	4.078E-03	.2187	4.812E-03	.2581	8.350E-03
LS 1408(250)	26.05	3.129E-03	.1678	4.078E-03	.2187	4.812E-03	.2581	8.350E-03
US 7402(250)	26.08	3.127E-03	.1677	4.076E-03	.2186	4.810E-03	.2580	8.346E-03
Y 7667(250)	28.13	3.004E-03	.1611	3.916E-03	.2100	4.620E-03	.2478	8.018E-03
M 7425(250)	28.13	3.004E-03	.1611	3.916E-03	.2100	4.620E-03	.2478	8.018E-03
LS 1409(250)	28.13	3.004E-03	.1611	3.916E-03	.2100	4.620E-03	.2478	8.018E-03
US 7401(250)	28.16	3.003E-03	.1611	3.914E-03	.2099	4.618E-03	.2477	8.014E-03
Y 7668(250)	30.21	2.845E-03	.1553	3.773E-03	.2024	4.452E-03	.2388	7.726E-03
M 7426(250)	30.21	2.845E-03	.1553	3.773E-03	.2023	4.450E-03	.2387	7.723E-03
LS 1411(250)	30.21	2.844E-03	.1552	3.772E-03	.2023	4.450E-03	.2387	7.723E-03
US 7403(250)	30.23	2.842E-03	.1551	3.770E-03	.2022	4.448E-03	.2386	7.719E-03

028

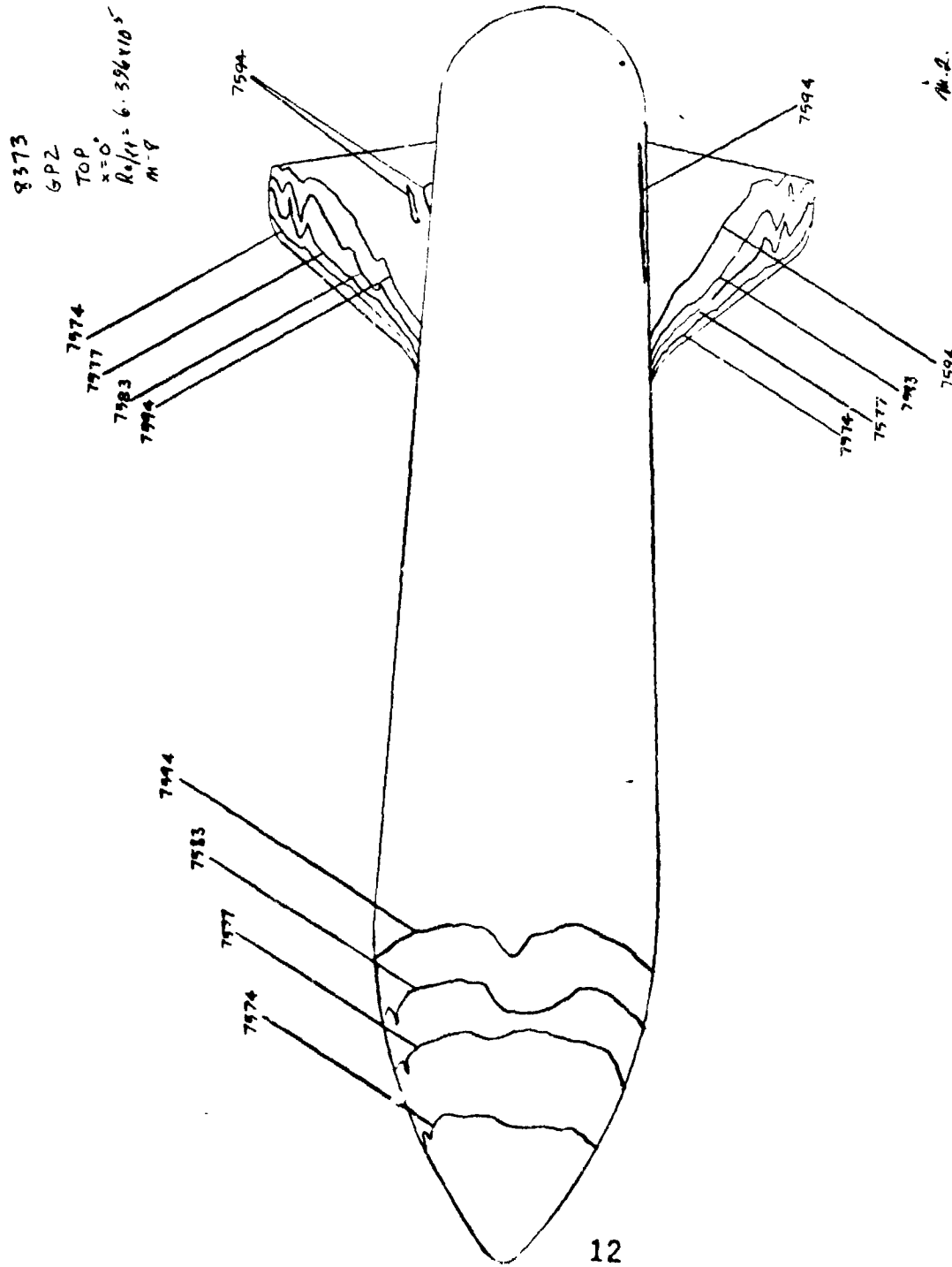
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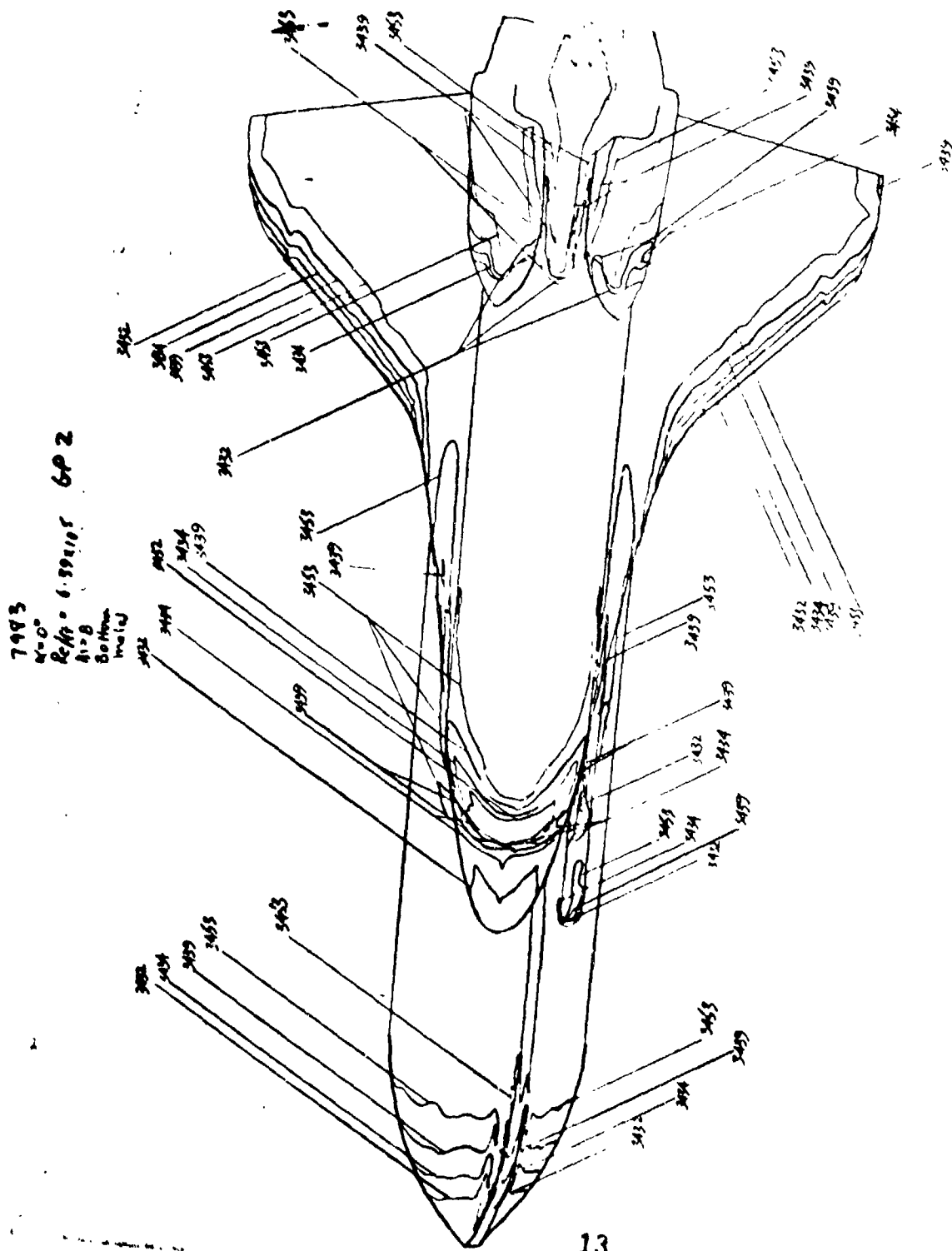


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6/28/73

NASA-H1 ORBITER HEATING

AEDC(AROT, INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL R

VA249

GROUP CONFIG MODEL MACH NO PRI(PSTIA) TO(363 R) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREBEND ROLL-MODEL YAW  
 > 1 MATCO 7.96 123.5 1209 .04 .04 0 180.00 .00  
 T-INF P-INF Q-INF V-INF RMO-INF MU-INF RE/FT HREF STREF  
 (DEG R) (PSIA) (FT/SEC) (SLUGS/FT<sup>3</sup>) (LR-SEC/FT<sup>2</sup>) (FT-1) (R= .0175FT) (R= .0175FT)  
 BR-4 .013 .580 3667 1.240E-05 7.117E-08 6.390E 05 1.846E-02 5.137E-02  
 CAMERA ROLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHOCXK) YBAR(10) BETA(10)  
 TOP(1) 8273  
 UPPER SIDE(US) 8075  
 LOWER SIDE(LS) 8118  
 BOTTOM(19) 7983

PIC NO	TIME DELTIME	H(10)	H(10)/HREF	H(.910)	H(.910)/HREF	H(.8510)	H(.8510)/HREF	ST(10)
T 7572(113)	1.15	MODEL HAS NOT REACHED CENTERLINE						
H 3430(113)	1.15	MODEL HAS NOT REACHED CENTERLINE						
LS 1614(113)	1.15	MODEL HAS NOT REACHED CENTERLINE						
US 7604(113)	1.18	MODEL HAS NOT REACHED CENTERLINE						
T 7573(113)	2.23	MODEL HAS NOT REACHED CENTERLINE						
H 3431(113)	2.23	MODEL HAS NOT REACHED CENTERLINE						
LS 1615(113)	2.23	MODEL HAS NOT REACHED CENTERLINE						
US 7609(113)	2.25	MODEL HAS NOT REACHED CENTERLINE						
INJECT TIME = 2.65								
T 7574(113)	3.20	1.645E-03	.0870	1.976E-03	.1071	2.237E-03	.1212	4.431E-03
H 3432(113)	3.20	1.505E-03	.0870	1.976E-03	.1071	2.237E-03	.1212	4.431E-03
LS 1616(113)	3.20	1.605E-03	.0870	1.976E-03	.1071	2.237E-03	.1212	4.431E-03
US 7610(113)	3.23	1.544E-03	.0864	1.941E-03	.1063	2.221E-03	.1203	4.401E-03
T 7575(113)	4.38	1.217E-03	.0692	1.571E-03	.0852	1.780E-03	.0964	3.523E-03
H 3433(113)	4.38	1.212E-03	.0689	1.564E-03	.0848	1.772E-03	.0960	3.511E-03
LS 1617(113)	4.41	1.266E-03	.0696	1.566E-03	.0848	1.772E-03	.0960	3.511E-03
US 7611(113)	4.41	1.266E-03	.0696	1.566E-03	.0848	1.772E-03	.0960	3.511E-03
T 7576(113)	5.43	1.049E-03	.0590	1.341E-03	.0726	1.518E-03	.0822	3.004E-03
H 3434(113)	5.46	1.049E-03	.0588	1.337E-03	.0724	1.513E-03	.0819	2.997E-03
LS 1618(113)	5.46	1.046E-03	.0588	1.337E-03	.0724	1.513E-03	.0819	2.997E-03
US 7612(113)	5.48	1.042E-03	.0586	1.332E-03	.0722	1.508E-03	.0817	2.988E-03
T 7577(113)	6.53	9.624E-04	.0521	1.185E-03	.0642	1.342E-03	.0726	2.656E-03
H 3435(113)	6.53	9.624E-04	.0521	1.185E-03	.0642	1.342E-03	.0726	2.656E-03
LS 1619(113)	6.53	9.624E-04	.0521	1.185E-03	.0642	1.342E-03	.0726	2.656E-03
US 7613(113)	6.56	9.604E-04	.0520	1.183E-03	.0641	1.338E-03	.0725	2.651E-03
T 7578(113)	7.61	8.740E-04	.0473	1.076E-03	.0583	1.218E-03	.0660	2.413E-03
H 3436(113)	7.61	8.740E-04	.0473	1.076E-03	.0583	1.218E-03	.0660	2.413E-03
LS 1620(113)	7.61	8.740E-04	.0473	1.076E-03	.0583	1.218E-03	.0660	2.413E-03

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6/28/73

AEDC(ARO, INC.) ARNOLD AFS, TENNESSEE  
VON KARMAN GAS DYNAMICS FACILITY  
50 INCH HYPERSONIC TUNNEL R

MASA-RI ORBITER HEATING

VA289

GROUP CONFIG MODEL MACH NO POI(PSIA) TO(DEG R) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREBEND ROLL-MODEL YAW  
2 1 MATED 7.96 123.5 1200 .04 .04 0 180.00 .00

T-INF P-INF Q-INF V-INF MU-INF RE/FT HREF STREF  
(DEG R) (PSIA) (PSIA) (FT/SEC) (SLUGS/FT<sup>3</sup>) (LBS-SEC/FT<sup>2</sup>) (FT-1) (R= .0175FT) (R= .0175FT)  
88.4 .013 .580 3667 1.240E-05 7.115E-08 6.193E 05 1.846E-02 5.136E-02

CAMERA ROLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHO/CXK) TBAR(TO) BETA(TO)  
TOP(T) 8373  
UPPER SIDE(US) 8075  
LOWER SIDE(LS) 8118  
BOTTOM(B) 7583

4.936E-02 4.5519E-02

PIC NO TIME DELTIME H(TO)/HREF H(-9TO) H(-9TO)/HREF H(-85TO) H(-85TO)/HREF ST(TO)  
T 7579(113) 8.68 7.20 8.060E-04 9.925E-04 1.123E-03 .0537 .0608 2.233E-03  
M 3437(113) 8.68 7.20 8.060E-04 9.925E-04 1.123E-03 .0537 .0608 2.233E-03  
LS 1621(113) 8.68 7.20 8.060E-04 9.925E-04 1.123E-03 .0537 .0608 2.233E-03  
US 7615(113) 8.71 7.22 8.046E-04 9.907E-04 1.121E-03 .0537 .0607 2.221E-03  
T 7580(113) 9.76 8.27 7.518E-04 9.257E-04 1.048E-03 .0501 .0567 2.075E-03  
M 3438(113) 9.76 8.27 7.518E-04 9.257E-04 1.048E-03 .0501 .0567 2.075E-03  
LS 1622(113) 9.76 8.27 7.518E-04 9.257E-04 1.048E-03 .0501 .0567 2.075E-03  
US 7616(113) 9.79 8.30 7.506E-04 9.243E-04 1.046E-03 .0500 .0566 2.071E-03  
T 7581(113) 10.84 9.35 7.072E-04 8.717E-04 9.854E-04 .0471 .0533 1.949E-03  
M 3439(113) 10.84 9.35 7.072E-04 8.717E-04 9.854E-04 .0471 .0533 1.949E-03  
LS 1623(113) 10.84 9.35 7.072E-04 8.717E-04 9.854E-04 .0471 .0533 1.949E-03  
US 7617(113) 10.86 9.37 7.062E-04 8.696E-04 9.841E-04 .0471 .0533 1.950E-03  
T 7582(113) 11.51 10.42 6.697E-04 8.246E-04 9.332E-04 .0446 .0505 1.847E-03  
M 3440(113) 11.51 10.42 6.697E-04 8.246E-04 9.332E-04 .0446 .0505 1.847E-03  
LS 1624(113) 11.51 10.42 6.697E-04 8.246E-04 9.332E-04 .0446 .0505 1.847E-03  
US 7618(113) 11.94 10.46 6.649E-04 8.220E-04 9.320E-04 .0446 .0505 1.845E-03  
T 7583(113) 12.59 11.50 6.376E-04 7.800E-04 8.884E-04 .0425 .0481 1.759E-03  
M 3441(113) 12.59 11.50 6.376E-04 7.800E-04 8.884E-04 .0425 .0481 1.759E-03  
LS 1625(113) 12.59 11.50 6.376E-04 7.800E-04 8.884E-04 .0425 .0481 1.759E-03  
US 7619(113) 13.01 11.53 6.309E-04 7.842E-04 8.875E-04 .0425 .0481 1.757E-03  
T 7584(113) 14.07 12.54 6.047E-04 7.507E-04 8.496E-04 .0406 .0460 1.682E-03  
M 3442(113) 14.07 12.54 6.047E-04 7.507E-04 8.496E-04 .0406 .0460 1.682E-03  
LS 1626(113) 14.09 12.54 6.047E-04 7.507E-04 8.496E-04 .0406 .0460 1.682E-03  
US 7620(113) 14.09 12.60 6.047E-04 7.507E-04 8.496E-04 .0406 .0460 1.682E-03  
T 7585(113) 15.14 13.65 5.852E-04 7.205E-04 8.154E-04 .0390 .0442 1.614E-03  
M 3443(113) 15.14 13.65 5.852E-04 7.205E-04 8.154E-04 .0390 .0442 1.614E-03  
LS 1627(113) 15.14 13.65 5.852E-04 7.205E-04 8.154E-04 .0390 .0442 1.614E-03

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6/28/73

NASA-RI ORBITER HEATING

VA280

AEDC(ARO, INC.) ARNOLD AFS, TENNESSEE  
VON KARMAN GAS DYNAMICS FACILITY  
50 INCH HYPERSONIC TUNNEL B

GROUP CONFIG MODEL MACH NO PO(P(SIA) T0( DEG R) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREBEND ROLL-MODEL YAW  
2 1 MATED 7.96 123.6 1208 .04 .04 0 180.00 .00

T-INF P-INF Q-INF V-INF MU-INF RE/FT HREF STREF  
(DEG R) (PSIA) (PSIA) (FT/SEC) (SLUGS/FT3) (LR-SEC/FT2) (FT-1) (R=.0175FT) (R=.0175FT)  
88.4 .013 .580 3667 1.241E-05 7.115E-08 6.397E 05 1.847E-02 5.134E-02

CAMERA ROLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHOXCAK) TRAR(TO) BETA(TO)  
TOP(T) 8373  
UPPER SIDE(US) 8075  
LOWER SIDE(LS) 8118  
BOTTOM(B) 7983

.0475

4.936E-02

4.5519E-02

PTC NO	TIME	MELTIME	H(TO)	H(TO)/HREF	M(.9TO)	M(.9TO)/HREF	H(.85TO)	M(.85TO)	M(.85TO)/HREF	ST(TO)
US 7421(113)	15.17	13.69	5.846E-04	.0316	7.198E-04	.0390	8.146E-04	.041	1.611E-03	
T 7546(113)	16.22	14.71	5.634E-04	.0305	6.937E-04	.0375	7.850E-04	.0425	1.553E-03	
LS 7444(113)	16.22	14.71	5.634E-04	.0305	6.937E-04	.0375	7.850E-04	.0425	1.553E-03	
US 7422(113)	16.22	14.71	5.634E-04	.0305	6.937E-04	.0375	7.850E-04	.0425	1.553E-03	
T 7547(113)	17.29	15.81	5.439E-04	.0294	6.696E-04	.0363	7.578E-04	.0410	1.500E-03	
LS 7445(113)	17.29	15.81	5.439E-04	.0294	6.696E-04	.0363	7.578E-04	.0410	1.500E-03	
US 7423(113)	17.32	15.83	5.439E-04	.0294	6.696E-04	.0363	7.578E-04	.0410	1.500E-03	
T 7588(113)	18.37	16.88	5.252E-04	.0285	6.474E-04	.0351	7.333E-04	.0397	1.449E-03	
LS 7446(113)	18.37	16.88	5.252E-04	.0285	6.474E-04	.0351	7.333E-04	.0397	1.449E-03	
US 7424(113)	18.40	16.91	5.258E-04	.0295	6.475E-04	.0351	7.327E-04	.0397	1.450E-03	
LS 7439(113)	18.40	16.91	5.258E-04	.0295	6.475E-04	.0351	7.327E-04	.0397	1.450E-03	
T 7544(113)	19.45	17.94	5.102E-04	.0276	6.242E-04	.0340	7.110E-04	.0385	1.407E-03	
LS 7425(113)	19.47	17.94	5.102E-04	.0276	6.242E-04	.0340	7.110E-04	.0385	1.407E-03	
US 7425(113)	19.47	17.94	5.102E-04	.0276	6.242E-04	.0340	7.110E-04	.0385	1.407E-03	
LS 7431(113)	20.52	18.03	4.956E-04	.0268	6.102E-04	.0330	6.906E-04	.0374	1.367E-03	
US 7426(113)	20.55	19.04	4.953E-04	.0268	6.098E-04	.0330	6.901E-04	.0374	1.365E-03	
LS 7432(113)	20.55	19.04	4.953E-04	.0268	6.098E-04	.0330	6.901E-04	.0374	1.365E-03	
T 7491(113)	21.50	20.41	4.786E-04	.0259	5.893E-04	.0319	6.669E-04	.0361	1.320E-03	
LS 7433(113)	21.50	20.41	4.786E-04	.0259	5.893E-04	.0319	6.669E-04	.0361	1.320E-03	
US 7427(113)	21.53	20.44	4.783E-04	.0259	5.889E-04	.0319	6.665E-04	.0361	1.318E-03	

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6/28/73

NASA-R1 ORBITER HEATING

AEDC(ARO,INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 56 INCH HYPERSONIC TUNNEL B

VA209

GROUP CONFIG MODEL MACH NO PQ(PSIA) TO(EG R) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREBEND ROLL-MODEL YAW  
 2 1 7.96 123.7 1288 .04 .04 0 180.00 .00

T-INF P-INF O-INF V-INF MU-INF MU-INF RE/FT MREF STREF  
 TOPG R (PQIA) (PQIA) (FT/SEC) (SLUGS/FT2) (L9-SEC/FT2) (FT-1) (R= .0175FT) (R= .0175FT)  
 88.4 .013 .588 3667 1.242E-05 7.115E-08 6.402E 05 1.848E-02 5.132E-02

CAMERA ROLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHOKACK) TBAR(TO) BETA(TO)

TOP(T) 8373  
 UPPER SIDE(US) 8075  
 LOWER SIDE(LS) 8118  
 BOTTOM(TB) 7983

.0475

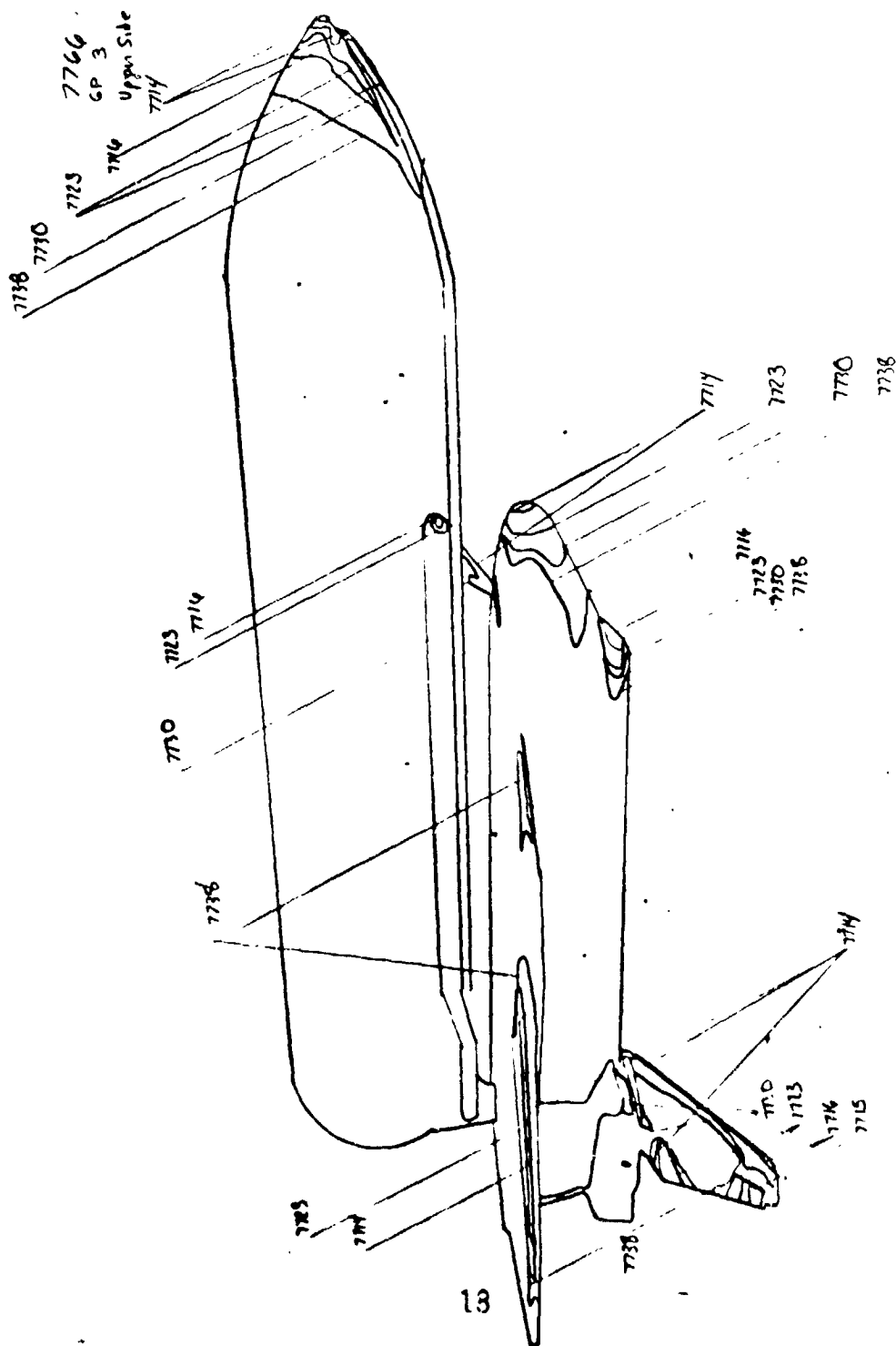
4.936E-02 4.5519E-02

PIC NO TIME DELTIME H(TO) H(TO)/MREF H(.9TO) H(.9TO)/MREF H(.85TO) H(.85TO)/MREF ST(TO)  
 T 7592(113) 23.98 22.49 4.559E-04 .0247 5.614E-04 .0304 6.353E-04 .0344 1.257E-03  
 M 3450(113) 23.58 22.49 4.559E-04 .0247 5.614E-04 .0304 6.353E-04 .0344 1.257E-03  
 LS 1636(113) 23.58 22.49 4.559E-04 .0247 5.614E-04 .0304 6.353E-04 .0344 1.257E-03  
 US 7628(113) 24.00 22.51 4.557E-04 .0236 5.611E-04 .0291 6.079E-04 .0329 1.201E-03  
 T 7593(113) 26.05 24.57 4.362E-04 .0236 5.371E-04 .0291 6.079E-04 .0329 1.201E-03  
 M 3451(113) 26.05 24.57 4.362E-04 .0236 5.371E-04 .0291 6.079E-04 .0329 1.201E-03  
 LS 1635(113) 26.05 24.57 4.362E-04 .0236 5.371E-04 .0291 6.079E-04 .0329 1.201E-03  
 US 7629(113) 26.08 24.59 4.360E-04 .0227 5.369E-04 .0291 6.076E-04 .0329 1.203E-03  
 T 7594(113) 28.13 26.64 4.189E-04 .0227 5.158E-04 .0279 5.837E-04 .0316 1.154E-03  
 M 3452(113) 28.13 26.64 4.189E-04 .0227 5.158E-04 .0279 5.837E-04 .0316 1.154E-03  
 LS 1636(113) 28.13 26.64 4.189E-04 .0227 5.158E-04 .0279 5.837E-04 .0316 1.154E-03  
 US 7630(113) 28.16 26.67 4.187E-04 .0227 5.155E-04 .0279 5.834E-04 .0316 1.153E-03  
 M 3453(113) 30.18 28.79 4.036E-04 .0218 4.970E-04 .0269 5.624E-04 .0304 1.112E-03  
 T 7595(113) 30.21 28.72 4.035E-04 .0218 4.948E-04 .0269 5.622E-04 .0304 1.110E-03  
 LS 1637(113) 30.21 28.72 4.035E-04 .0218 4.948E-04 .0269 5.622E-04 .0304 1.110E-03  
 US 7631(113) 30.23 28.75 4.033E-04 .0218 4.966E-04 .0269 5.619E-04 .0304 1.112E-03

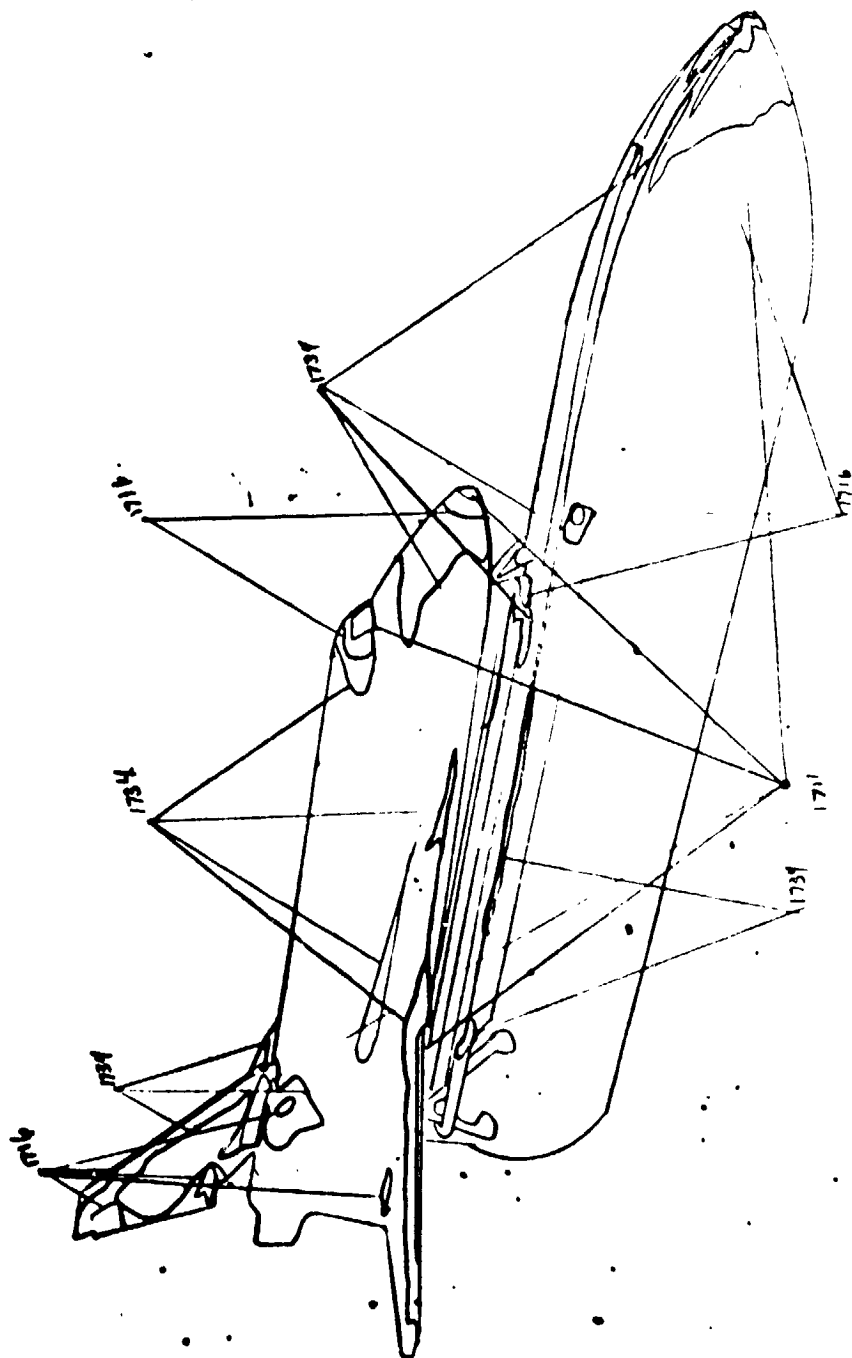
MODEL HAS LEFT CENTERLINE

30.36

REPRODUCIBILITY OF THE ORIGINAL PAGE IS POOR.

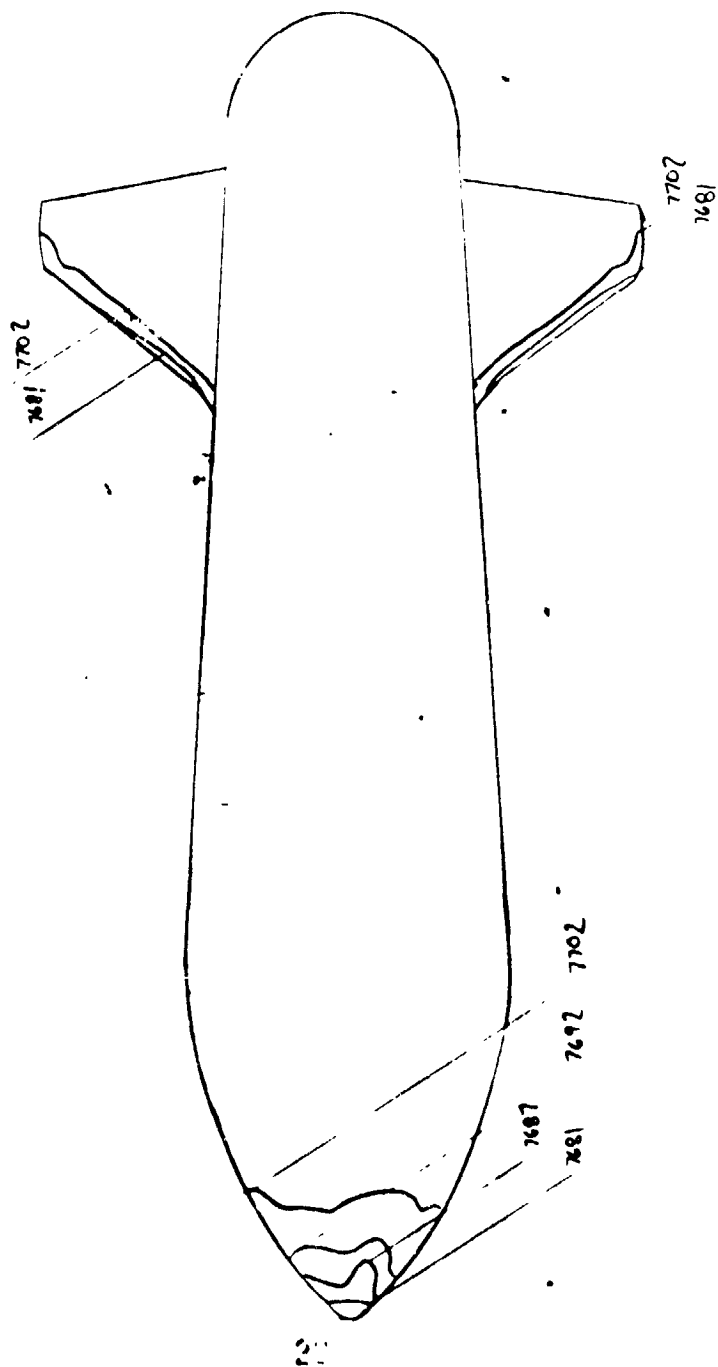


Group 3  
7908  
Lower 52e  
W

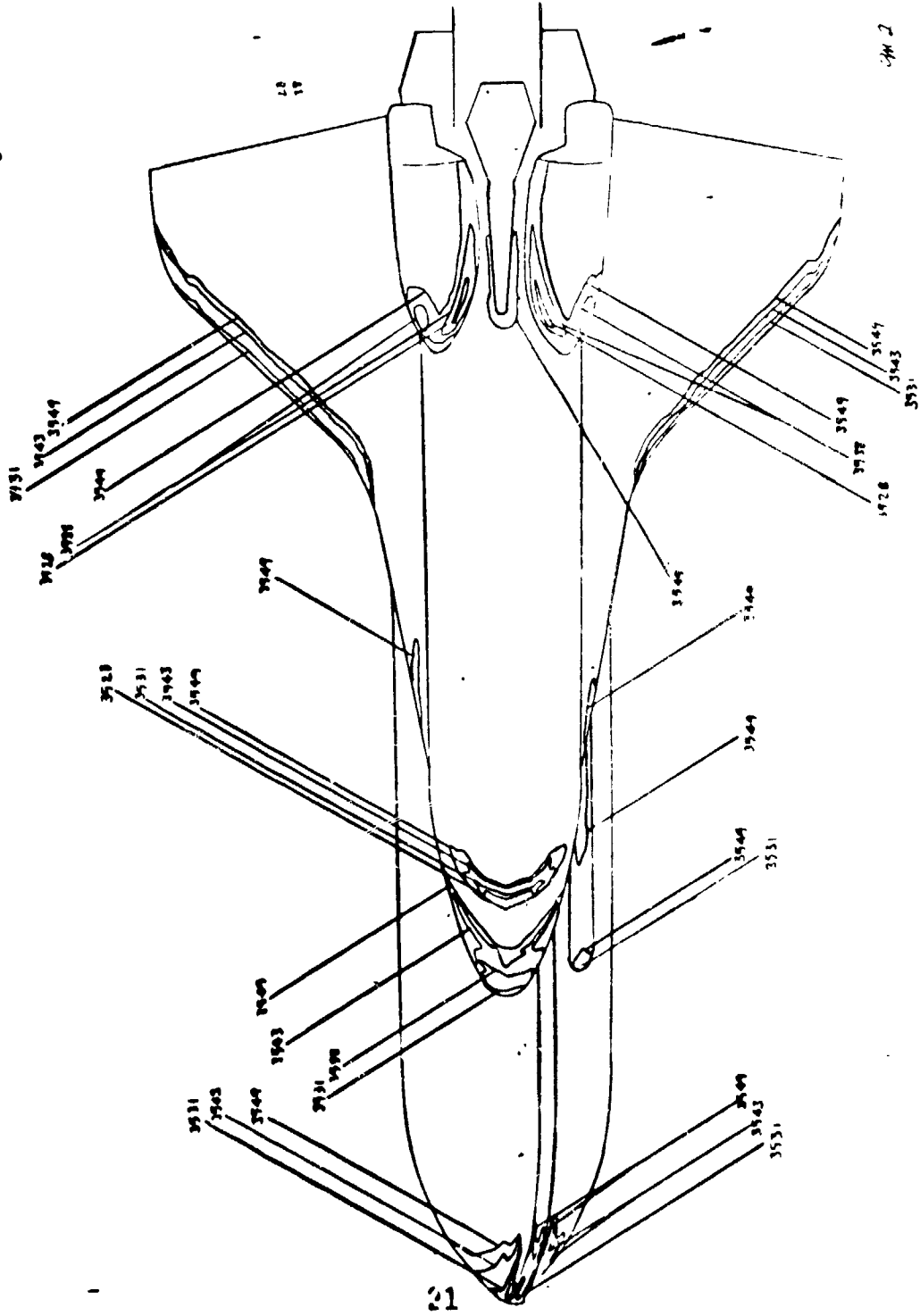




Group 3  
7p  
no  
B223



9234  
GP 3  
BOTTOM



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6/29/73

## NASA-RI ORBITER HEATING

VA289

AEDC(ARO,INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL A

GROUP	CONFIG	MODEL	MACH NO	PO(PSTIA)	TO(DEC R)	ALPHA-MODEL	ALPHA-SECTION	ALPHA-PREBEND	ROLL-MODEL	YAW
3	1	MATED	7.96	120.7	1198	-5.01	5.01	0	180.00	-0.00
T-INF	P-INF	O-INF	V-INF	RHO-INF	MU-INF	PR/FT	MREF	STREF		
(DEC R)	(PSTIA)	(PSTIA)	(FT/SEC)	(SLUGS/FT <sup>3</sup> )	(UP-SEC/FT <sup>2</sup> )	(FT-1)	(P= .0175FT)	(R= .0175FT)		
87.4	.013	.566	3650	1.223E-05	7.052E-08	6.332E 05	1.922E-02	5.167E-02		
CAMERA	ROLL NO	PAINT TEMP (DEG F)	INITIAL TEMP (DEG F)	SQUARE ROOT (RM0XCKX)	TBAR(TO)	BETA(TO)				
TOP(T)	8223									
UPPER SURF(US)	7765									
LOWER SURF(LS)	7908									
MIDTOW(R)	8234									

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PIC NO	TIME DELTME	M(TOI)	M(TOI)/MREF	M(.970)/MREF	M(.8570)	M(.8570)/MREF	ST(TO)
1 7474(250)	1.15	MODEL HAS NOT REACHED CENTERLINE					
2 7474(250)	1.15	MODEL HAS NOT REACHED CENTERLINE					
3 7474(250)	1.15	MODEL HAS NOT REACHED CENTERLINE					
4 7474(250)	1.15	MODEL HAS NOT REACHED CENTERLINE					
5 7474(250)	1.15	MODEL HAS NOT REACHED CENTERLINE					
6 7474(250)	1.15	MODEL HAS NOT REACHED CENTERLINE					
7 7474(250)	1.15	MODEL HAS NOT REACHED CENTERLINE					
8 7474(250)	1.15	MODEL HAS NOT REACHED CENTERLINE					
9 7474(250)	1.15	MODEL HAS NOT REACHED CENTERLINE					
10 7474(250)	1.15	MODEL HAS NOT REACHED CENTERLINE					
11 7474(250)	1.15	MODEL HAS NOT REACHED CENTERLINE					
12 7474(250)	1.15	MODEL HAS NOT REACHED CENTERLINE					
13 7474(250)	1.15	MODEL HAS NOT REACHED CENTERLINE					
14 7474(250)	1.15	MODEL HAS NOT REACHED CENTERLINE					
15 7474(250)	1.15	MODEL HAS NOT REACHED CENTERLINE					
16 7474(250)	1.15	MODEL HAS NOT REACHED CENTERLINE					
17 7474(250)	1.15	MODEL HAS NOT REACHED CENTERLINE					
18 7474(250)	1.15	MODEL HAS NOT REACHED CENTERLINE					
19 7474(250)	1.15	MODEL HAS NOT REACHED CENTERLINE					
20 7474(250)	1.15	MODEL HAS NOT REACHED CENTERLINE					
21 7474(250)	1.15	MODEL HAS NOT REACHED CENTERLINE					
22 7474(250)	1.15	MODEL HAS NOT REACHED CENTERLINE					
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24 7474(250)	1.15	MODEL HAS NOT REACHED CENTERLINE					
25 7474(250)	1.15	MODEL HAS NOT REACHED CENTERLINE					
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31 7474(250)	1.15	MODEL HAS NOT REACHED CENTERLINE					
32 7474(250)	1.15	MODEL HAS NOT REACHED CENTERLINE					
33 7474(250)	1.15	MODEL HAS NOT REACHED CENTERLINE					
34 7474(250)	1.15	MODEL HAS NOT REACHED CENTERLINE					
35 7474(250)	1.15	MODEL HAS NOT REACHED CENTERLINE					
36 7474(250)	1.15	MODEL HAS NOT REACHED CENTERLINE					
37 7474(250)	1.15	MODEL HAS NOT REACHED CENTERLINE					
38 7474(250)	1.15	MODEL HAS NOT REACHED CENTERLINE					
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40 7474(250)	1.15	MODEL HAS NOT REACHED CENTERLINE					
41 7474(250)	1.15	MODEL HAS NOT REACHED CENTERLINE					
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64 7474(250)	1.15	MODEL HAS NOT REACHED CENTERLINE					
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68 7474(250)	1.15	MODEL HAS NOT REACHED CENTERLINE					
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73 7474(250)	1.15	MODEL HAS NOT REACHED CENTERLINE					
74 7474(250)	1.15	MODEL HAS NOT REACHED CENTERLINE					
75 7474(250)	1.15	MODEL HAS NOT REACHED CENTERLINE					
76 7474(250)	1.15	MODEL HAS NOT REACHED CENTERLINE					
77 7474(250)	1.15	MODEL HAS NOT REACHED CENTERLINE					
78 7474(250)	1.15	MODEL HAS NOT REACHED CENTERLINE					
79 7474(250)	1.15	MODEL HAS NOT REACHED CENTERLINE					
80 7474(250)	1.15	MODEL HAS NOT REACHED CENTERLINE					
81 7474(250)	1.15	MODEL HAS NOT REACHED CENTERLINE					
82 7474(250)	1.15	MODEL HAS NOT REACHED CENTERLINE					
83 7474(250)	1.15	MODEL HAS NOT REACHED CENTERLINE					
84 7474(250)	1.15	MODEL HAS NOT REACHED CENTERLINE					
85 7474(250)	1.15	MODEL HAS NOT REACHED CENTERLINE					
86 7474(250)	1.15	MODEL HAS NOT REACHED CENTERLINE					
87 7474(250)	1.15	MODEL HAS NOT REACHED CENTERLINE					
88 7474(250)	1.15	MODEL HAS NOT REACHED CENTERLINE					
89 7474(250)	1.15	MODEL HAS NOT REACHED CENTERLINE					
90 7474(250)	1.15	MODEL HAS NOT REACHED CENTERLINE					
91 7474(250)	1.15	MODEL HAS NOT REACHED CENTERLINE					
92 7474(250)	1.15	MODEL HAS NOT REACHED CENTERLINE					
93 7474(250)	1.15	MODEL HAS NOT REACHED CENTERLINE					
94 7474(250)	1.15	MODEL HAS NOT REACHED CENTERLINE					
95 7474(250)	1.15	MODEL HAS NOT REACHED CENTERLINE					
96 7474(250)	1.15	MODEL HAS NOT REACHED CENTERLINE					
97 7474(250)	1.15	MODEL HAS NOT REACHED CENTERLINE					
98 7474(250)	1.15	MODEL HAS NOT REACHED CENTERLINE					
99 7474(250)	1.15	MODEL HAS NOT REACHED CENTERLINE					
100 7474(250)	1.15	MODEL HAS NOT REACHED CENTERLINE					

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## NASA-RI ORBITER PEATING

VA209

AEDC(ARO, INC.) ARNOLD AFS, TENNESSEE  
VON KARMAN GAS DYNAMICS FACILITY  
50 INCH HYPERSONIC TUNNEL B

6/29/73

GROUP	CONF	MODEL	MACH NO	PO(P/SIA)	TO(IDEG R)	ALPHA-MODEL	ALPHA-SECTOR	ALPHA-PREBEND	ROLL-MODEL	YAW
3	1	MATED	7.96	121.3	1198	-5.01	5.01	0	100.00	--00
Y-1AF	P-1NF	Q-1NF	V-1NF	RMO-1NF	MU-1NF	RF/FT	MREF	STREF		
(IDEG R)	(P/SIA)	(P/SIA)	(FT/SEC)	(SLUGS/FT3)	(LBS-SEC/FT2)	(FT-1)	(R= .0175FT)	(R= .0175FT)		
87.6	.013	.569	3651	1.229E-05	7.055E-08	6.358E 05	1.427E-02	5.156E-02		
CAMERA	ROLL NO	PAINT TEMP (DEG F)	INITIAL TEMP (DEG F)	SQUARE ROOT (RHO/CXK)	TBAR(TOI)	BETA(TOI)				
TOP(T)	8223									
UPPER SIDE(US)	7766									
LOWER SIDE(LS)	7908									
MOTCH(M)	8234									

PIC NO	TYPE	DELTIME	M(TOI)	M(TOI)/MREF	M(.9701)	M(.9701)/MREF	M1(.85TO)	M1(.85TO)/MREF	ST(TOI)
1	7482(P50)	7.63	6.395E-03	.3500	8.334E-03	.4560	9.832E-03	.5380	1.776E-02
M	1530(P50)	7.63	6.395E-03	.3500	8.334E-03	.4560	9.832E-03	.5380	1.776E-02
US	7718(P50)	7.66	6.342E-03	.3497	8.317E-03	.4557	9.812E-03	.5376	1.777E-02
LS	1714(P50)	7.66	6.342E-03	.3497	8.317E-03	.4557	9.812E-03	.5376	1.777E-02
1	7483(P50)	8.71	5.900E-03	.3230	7.688E-03	.4209	9.070E-03	.4965	1.640E-02
M	3531(P50)	8.71	5.900E-03	.3230	7.688E-03	.4209	9.070E-03	.4965	1.640E-02
US	7719(P50)	8.74	5.849E-03	.3224	7.675E-03	.4201	9.054E-03	.4957	1.637E-02
LS	1715(P50)	8.74	5.849E-03	.3224	7.675E-03	.4201	9.054E-03	.4957	1.637E-02
1	7484(P50)	9.79	5.504E-03	.3012	7.172E-03	.3925	8.461E-03	.4430	1.529E-02
M	3532(P50)	9.79	5.504E-03	.3012	7.172E-03	.3925	8.461E-03	.4430	1.529E-02
US	7720(P50)	9.81	5.455E-03	.3004	7.161E-03	.3920	8.449E-03	.4425	1.527E-02
LS	1716(P50)	9.81	5.455E-03	.3004	7.161E-03	.3920	8.449E-03	.4425	1.527E-02
1	7485(P50)	10.66	5.178E-03	.2835	6.744E-03	.3694	7.961E-03	.4358	1.439E-02
M	3533(P50)	10.66	5.178E-03	.2835	6.744E-03	.3694	7.961E-03	.4358	1.439E-02
US	7721(P50)	10.69	5.117E-03	.2831	6.733E-03	.3689	7.959E-03	.4352	1.437E-02
LS	1717(P50)	10.69	5.117E-03	.2831	6.733E-03	.3689	7.959E-03	.4352	1.437E-02
1	7486(P50)	11.54	4.914E-03	.2642	6.391E-03	.3490	7.645E-03	.4124	1.361E-02
M	3534(P50)	11.54	4.914E-03	.2642	6.391E-03	.3490	7.645E-03	.4124	1.361E-02
US	7722(P50)	11.56	4.804E-03	.2640	6.371E-03	.3493	7.531E-03	.4121	1.360E-02
LS	1718(P50)	11.56	4.804E-03	.2640	6.371E-03	.3493	7.531E-03	.4121	1.360E-02
1	7487(P50)	13.04	4.655E-03	.2554	6.079E-03	.3328	7.171E-03	.3926	1.296E-02
M	3535(P50)	13.04	4.655E-03	.2554	6.079E-03	.3328	7.171E-03	.3926	1.296E-02
US	7723(P50)	13.04	4.645E-03	.2554	6.072E-03	.3328	7.171E-03	.3926	1.296E-02
LS	1719(P50)	13.04	4.645E-03	.2554	6.072E-03	.3328	7.171E-03	.3926	1.296E-02
1	7488(P50)	14.12	4.461E-03	.2440	5.814E-03	.3180	6.859E-03	.3752	1.238E-02
M	3536(P50)	14.12	4.461E-03	.2440	5.814E-03	.3180	6.859E-03	.3752	1.238E-02
US	7724(P50)	14.12	4.461E-03	.2440	5.814E-03	.3180	6.859E-03	.3752	1.238E-02
LS	1720(P50)	14.12	4.461E-03	.2440	5.814E-03	.3180	6.859E-03	.3752	1.238E-02

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NASA-R1 ORBITER HEATING

VA289

AEDC(ARO, INC.) ARNOLD AFS, TENNESSEE  
VON KARMAN GAS DYNAMICS FACILITY  
50 INCH HYPERSONIC TUNNEL #

6/29/73

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GROUP	CONFIG	MODEL	MACH NO	PO(PSTIA)	TO(DEC R)	ALPHA-MODEL	ALPHA-SECTOR	ALPHA-PREBEND	ROLL-MODEL	YAW
3	1	MATEC	7.96	121.5	1158	-5.01	5.01	0	180.00	-0.00
T-1AF	P-1NF	Q-1NF	V-1NF	RHO-1NF	MU-1NF	PF/FT	HREF	STR-LF		
(DEG R)	(PSTIA)	(FT/SFC)	(FT/SEC)	(SLUGS/FT <sup>3</sup> )	(LB-SEC/FT <sup>2</sup> )	(FT-1)	(R= .0175FT)	(R= .0175FT)		
87.6	.013	.570	3651	1.231E-05	7.055E-08	6.369E 05	1.828E-02	5.152E-02		
CAMFRA	ROLL NO	PAINT TEMP (DEG F)	INITIAL TEMP (DEG F)	SQUARE ROOT (RHOXCK)	TRAR(10)	BETA(10)				
TOP(T)	8223									
UPPER SINE(US)	7166									
LOWER SINE(LS)	750P									
MOTOM(15)	8234									

PIC NO	TIME DELTIME	M(10)	M(10)/HREF	M(.910)	M(.910)/HREF	M(.8510)	M(.8510)/HREF	ST(10)
US 772(1250)	14.14	4.457E-03	.2440	5.808E-03	.3180	6.852E-03	.3751	1.239E-02
T 749(1250)	15.19	4.243E-03	.2343	5.581E-03	.3054	6.584E-03	.3603	1.189E-02
M 753(1250)	15.19	4.243E-03	.2343	5.581E-03	.3054	6.584E-03	.3603	1.189E-02
LS 172(1250)	15.19	4.243E-03	.2343	5.581E-03	.3054	6.584E-03	.3603	1.189E-02
US 772(1250)	15.22	4.279E-03	.2340	5.5.6E-03	.3050	6.574E-03	.3596	1.187E-02
T 749(1250)	16.27	4.124E-03	.2256	5.374E-03	.2939	6.240E-03	.3468	1.144E-02
M 753(1250)	16.27	4.124E-03	.2256	5.374E-03	.2939	6.240E-03	.3468	1.144E-02
LS 172(1250)	16.27	4.124E-03	.2256	5.374E-03	.2939	6.240E-03	.3468	1.144E-02
US 772(1250)	16.29	4.100E-03	.2256	5.369E-03	.2939	6.234E-03	.3468	1.145E-02
T 749(1250)	17.34	3.941E-03	.2179	5.194E-03	.2839	6.121E-03	.3349	1.104E-02
M 753(1250)	17.34	3.941E-03	.2179	5.194E-03	.2839	6.121E-03	.3349	1.104E-02
LS 172(1250)	17.34	3.941E-03	.2179	5.194E-03	.2839	6.121E-03	.3349	1.104E-02
US 772(1250)	17.37	3.974E-03	.2177	5.194E-03	.2837	6.116E-03	.3347	1.105E-02
T 749(1250)	18.42	3.853E-03	.2108	5.021E-03	.2747	5.923E-03	.3241	1.070E-02
M 753(1250)	18.42	3.853E-03	.2108	5.021E-03	.2747	5.923E-03	.3241	1.070E-02
LS 172(1250)	18.42	3.853E-03	.2108	5.021E-03	.2747	5.923E-03	.3241	1.070E-02
US 772(1250)	18.45	3.860E-03	.2107	5.017E-03	.2745	5.919E-03	.3239	1.069E-02
T 749(1250)	19.50	3.746E-03	.2043	4.844E-03	.2663	5.743E-03	.3141	1.037E-02
M 753(1250)	19.50	3.746E-03	.2043	4.844E-03	.2663	5.743E-03	.3141	1.037E-02
LS 172(1250)	19.52	3.733E-03	.2044	4.844E-03	.2663	5.739E-03	.3142	1.038E-02
US 772(1250)	20.57	3.629E-03	.1987	4.729E-03	.2589	5.579E-03	.3054	1.009E-02
T 749(1250)	20.57	3.629E-03	.1987	4.729E-03	.2589	5.579E-03	.3054	1.009E-02
M 753(1250)	20.57	3.629E-03	.1987	4.729E-03	.2589	5.579E-03	.3054	1.009E-02
LS 172(1250)	20.57	3.629E-03	.1987	4.729E-03	.2589	5.579E-03	.3054	1.009E-02
US 773(1250)	20.60	3.626E-03	.1984	4.726E-03	.2586	5.575E-03	.3051	1.007E-02

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UNCLASSIFIED  
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6/29/73

NASA-RT ORBITER HEATING

VA299

AEDC(ARL, INC.) ARNOLD AFS, TENNESSEE  
VON KARMAN GAS DYNAMICS FACILITY  
50 INCH HYPERSONIC TUNNEL B

GROUP COMP10 MODEL MACH NO PO(PSTA) TO(DEG R) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREBEND ROLL-MODEL YAW  
3 1 MATED 7.56 121.4 1198 -5.01 5.01 0 180.00 -0.00

T-TAF P-INF G-INF V-INF RMO-INF MU-INF RE/FT MREF STREF  
(DEG R) (PSTA) (PSTA) (FT/SFC) (SLUGS/FT3) (LB-SEC/FT2) (FT-1) (R= .0175FT) (R= .0175FT)  
87.6 .013 .576 3651 1.210E-05 7.054E-08 6.365E 05 1.027E-02 5.154E-02

CAMFRA ROLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RMO/CK) TRAR(10) BETA(10)  
TOP(11) 8223  
IMPFM SIDE(US) 7766  
LOWER SIDE(US) 7808  
BOTTOM(8) 8234

.0535

2.029E-01 2.963.E-01

PIC NO	TIME DELTIME	M(TO)	M(TO)/MREF	M(.970)	M(.970)/MREF	M(.8510)	M(.8510)/MREF	ST(10)
T 7695(250)	21.65	20.16	1.931	4.601E-03	.2517	5.420E-03	.2969	9.798E-03
M 3543(250)	21.65	20.16	1.931	4.601E-03	.2517	5.420E-03	.2969	9.798E-03
US 7731(250)	21.67	20.19	1.932	4.598E-03	.2517	5.425E-03	.2970	9.807E-03
T 7696(250)	22.73	21.24	1.982	4.598E-03	.2453	5.289E-03	.2894	9.553E-03
M 3544(250)	22.73	21.24	1.982	4.598E-03	.2453	5.289E-03	.2894	9.553E-03
US 7732(250)	22.75	21.26	1.981	4.480E-03	.2452	5.289E-03	.2894	9.553E-03
T 7697(250)	23.60	22.31	1.936	4.374E-03	.2193	5.160E-03	.2823	9.320E-03
M 3545(250)	23.60	22.31	1.936	4.374E-03	.2193	5.160E-03	.2823	9.320E-03
US 7733(250)	23.63	22.34	1.935	4.371E-03	.2192	5.157E-03	.2822	9.315E-03
T 7698(250)	25.70	24.22	1.762	4.194E-03	.2296	4.950E-03	.2709	8.942E-03
M 3546(250)	25.70	24.22	1.762	4.194E-03	.2296	4.950E-03	.2709	8.942E-03
US 7734(250)	25.75	24.27	1.762	4.194E-03	.2296	4.948E-03	.2709	8.944E-03
T 7699(250)	27.20	26.29	1.691	4.024E-03	.2204	4.753E-03	.2600	8.579E-03
M 3547(250)	27.20	26.29	1.691	4.024E-03	.2204	4.753E-03	.2600	8.579E-03
US 7735(250)	27.21	26.33	1.692	4.024E-03	.2205	4.751E-03	.2601	8.579E-03
T 7700(250)	29.66	28.37	1.631	3.879E-03	.2125	4.576E-03	.2507	8.285E-03
M 3548(250)	29.66	28.37	1.631	3.879E-03	.2125	4.576E-03	.2507	8.285E-03
US 7736(250)	29.68	28.39	1.629	3.877E-03	.2122	4.574E-03	.2504	8.268E-03
T 7701(250)	31.94	30.45	1.573	3.744E-03	.2060	4.417E-03	.2418	7.985E-03
M 3549(250)	31.94	30.45	1.573	3.744E-03	.2060	4.417E-03	.2418	7.985E-03

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6/29/73

NASA-RI ORBITER HEATING

AECIARO, INC.) ARNOLD AFS, TENNESSEE  
VON KARMAN GAS DYNAMICS FACILITY  
50 INCH HYPERSONIC TUNNEL R

VA289

GROUP CONFIG MODEL MACH NO POI(PSTIA) TOI(DES R) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREBEND ROLL-MODEL YAW  
3 1 7.96 121.3 1.98 5.01 5.01 0 180.00 -0.00  
T-INF P-INF O-INF V-INF MU-INF MU-INF RE/FT HREF STREF  
(DEG R) (PSIA) (PSIA) (FT/SEC) (SLUGS/FT3) (LB-SEC/FT2) (FT-1) (R= .0175FT) (R= .0175FT)  
87.6 .013 .569 3650 1.229E-05 7.052E-08 6.362E 05 1.827E-02 5.155E-02  
CAMERA ROLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHOKCKK) TBAR(TO) BETA(TO)  
TOP(TI) 8223 76 .0535 2.629E-01 2.9632E-01  
UPPER SIDE(LS) 7766  
LOWER SIDE(LS) 7909  
BOTTOM(B) 8234

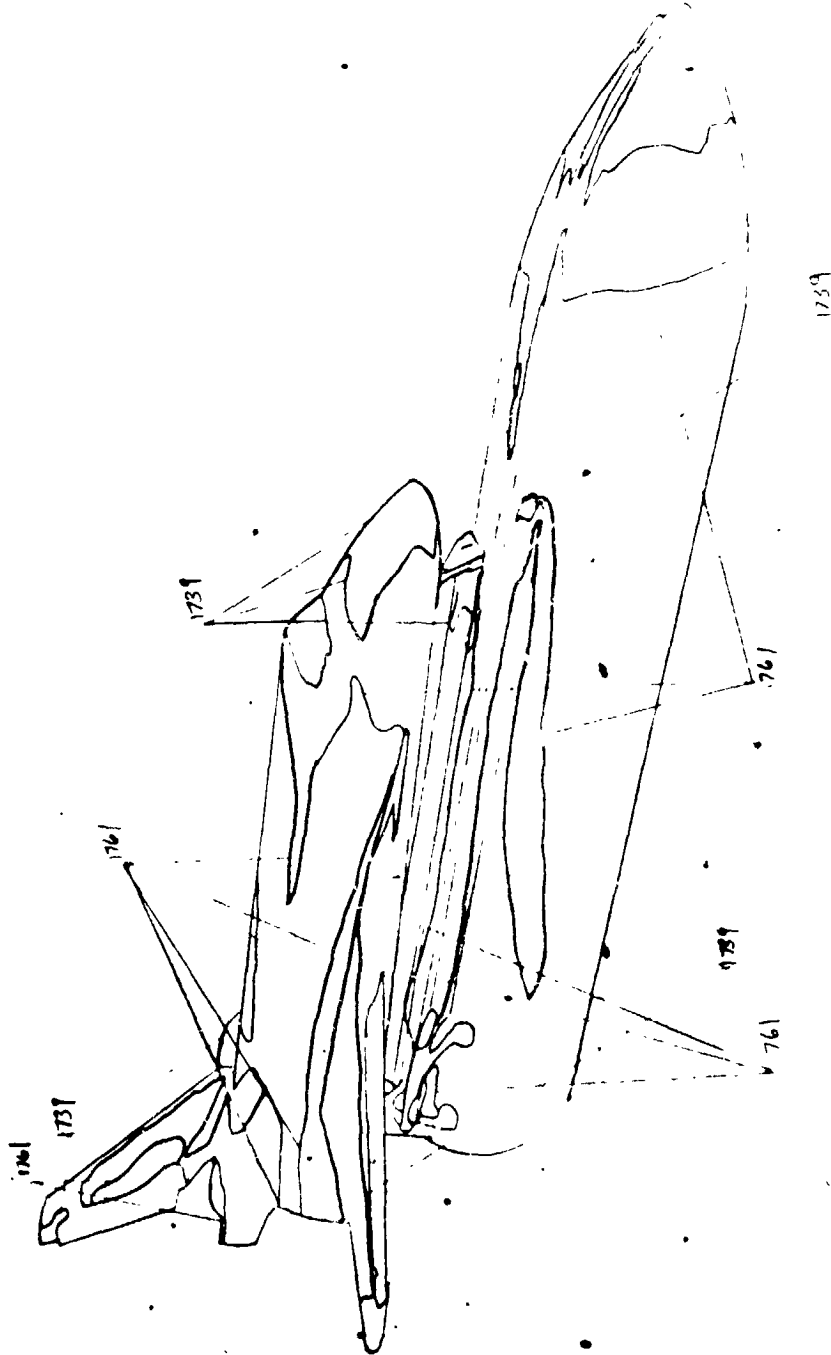
PIC NO TIME DELTIME H(TOI) H(TOI)/HREF H(.9TO) H(.9TO)/HREF H(.85TO) H(.85TO)/HREF ST(TOI)  
US 7737(250) 31.96 30.47 2.872E-03 .1573 3.742E-03 .2050 4.415E-03 .2418 7.988E-03  
LS 7733(250) 31.96 30.47 2.872E-03 .1573 3.742E-03 .2050 4.415E-03 .2418 7.988E-03  
T 7702(250) 34.01 32.52 2.780E-03 .1522 3.622E-03 .1983 4.274E-03 .2340 7.726E-03  
M 3550(250) 34.01 32.52 2.780E-03 .1522 3.622E-03 .1983 4.274E-03 .2340 7.726E-03  
LS 7734(250) 34.01 32.52 2.780E-03 .1522 3.622E-03 .1983 4.274E-03 .2340 7.726E-03  
US 7738(250) 34.04 32.55 2.779E-03 .1522 3.621E-03 .1984 4.272E-03 .2341 7.735E-03  
T 7703(250) 36.09 34.60 2.695E-03 .1476 3.512E-03 .1923 4.143E-03 .2269 7.496E-03  
M 3551(250) 36.09 34.60 2.695E-03 .1476 3.512E-03 .1923 4.143E-03 .2269 7.496E-03  
US 7739(250) 36.12 34.63 2.694E-03 .1475 3.511E-03 .1922 4.142E-03 .2267 7.488E-03  
LS 7735(250) 36.12 34.63 2.694E-03 .1475 3.511E-03 .1922 4.142E-03 .2267 7.488E-03

037

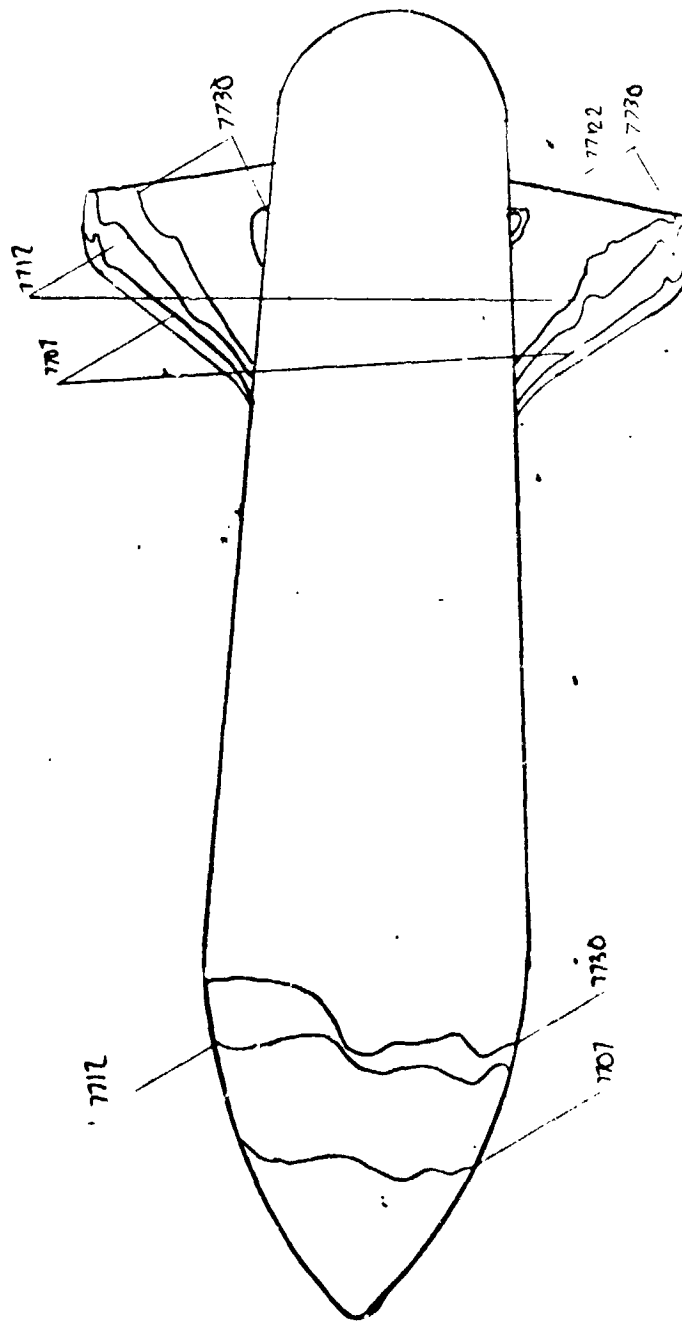




Group 4  
7908  
lower side  
mm



Group 4  
Top  
8223  
W





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6/29/73

NASA-RI ORBITER HEATING

VA289

AEDCI(ARO, INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL A

GROUP	CONFIG	MODEL	MACH NO	PO(PSIA)	TO( DEG R)	ALPHA-MODEL	ALPHA-SECTOR	ALPHA-PREBEND	ROLL-MODEL	YAW
A	1	MATED	7.96	122.8	1191	-5.04	5.04	0	180.00	-0.00
T-INF	P-INF	Q-INF	V-INF	RHO-INF	WU-INF	RE/FT	HREF	STREF		
(DEG R)	(PSIA)	(FT/SEC)	(SLUGS/FT <sup>3</sup> )	(LB-SEC/FT <sup>2</sup> )	(FT-1)	(R= .0175FT)	(R= .0175FT)			
87.1	.013	.576	3641	1.251E-05	7.015E-08	6.491E 05	1.816E-02	5.107E-02		
CAMERA	ROLL NO	PAINT TEMP (DEG F)	INITIAL TEMP (DEG F)	SQUARE ROOT (RHOXAKK)	TBAR(10)	BETA(10)				
TOP(1)	8223									
UPPER SINE(US)	7166									
LOWER SINE(LS)	7908									
BOTTOM(B)	8234									

PIC NO	TIME DELT	M(10)	M(10)/HREF	M(1.9T0)/HREF	M(1.85T0)	M(1.85T0)/HREF	ST(10)
A 3552(113)	1.13	MODEL HAS NOT REACHED CENTERLINE					
T 7704(113)	1.15	MODEL HAS NOT REACHED CENTERLINE					
US 7740(113)	1.15	MODEL HAS NOT REACHED CENTERLINE					
LS 1736(113)	1.15	MODEL HAS NOT REACHED CENTERLINE					
T 7705(113)	2.23	MODEL HAS NOT REACHED CENTERLINE					
M 7653(113)	2.23	MODEL HAS NOT REACHED CENTERLINE					
LS 1737(113)	2.23	MODEL HAS NOT REACHED CENTERLINE					
US 7741(113)	2.25	MODEL HAS NOT REACHED CENTERLINE					
INJECT TIME =	2.05						
T 7706(113)	3.30	1.847E-03	1006	2.281E-03	1242	2.586E-03	1408
M 7654(113)	3.30	1.847E-03	1006	2.281E-03	1242	2.586E-03	1408
LS 1738(113)	3.30	1.847E-03	1006	2.281E-03	1242	2.586E-03	1408
US 7742(113)	3.33	1.835E-03	0999	2.266E-03	1234	2.568E-03	1399
T 7707(113)	4.28	1.464E-03	0797	1.807E-03	0984	2.049E-03	1116
M 7655(113)	4.28	1.464E-03	0797	1.807E-03	0984	2.049E-03	1116
LS 1739(113)	4.28	1.464E-03	0797	1.807E-03	0984	2.049E-03	1116
US 7743(113)	4.41	1.457E-03	0793	1.799E-03	0980	2.040E-03	1110
T 7708(113)	5.46	1.249E-03	0680	1.541E-03	0840	1.749E-03	0952
M 7656(113)	5.46	1.249E-03	0680	1.541E-03	0840	1.749E-03	0952
LS 1740(113)	5.48	1.245E-03	0678	1.538E-03	0838	1.743E-03	0949
US 7744(113)	5.48	1.245E-03	0678	1.538E-03	0838	1.743E-03	0949
T 7709(113)	6.13	1.108E-03	0603	1.368E-03	0745	1.551E-03	0844
M 7657(113)	6.13	1.108E-03	0602	1.365E-03	0743	1.547E-03	0842
LS 1741(113)	6.56	1.105E-03	0602	1.364E-03	0743	1.547E-03	0842
US 7745(113)	6.56	1.105E-03	0602	1.364E-03	0743	1.547E-03	0842
T 7710(113)	7.63	1.004E-03	0544	1.240E-03	0675	1.405E-03	0765
M 7658(113)	7.63	1.004E-03	0544	1.240E-03	0675	1.405E-03	0765
LS 1742(113)	7.63	1.004E-03	0544	1.240E-03	0675	1.405E-03	0765
US 7746(113)	7.63	1.004E-03	0544	1.240E-03	0675	1.405E-03	0765

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6/29/73

AEDC(ARH-INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL R

KASA-RI ORBITER HEATING

VA289

GROUP CONFIG MODEL MACH NO PO(PISA) TO(DEC R) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREEND ROLL-MODEL YAW  
 4 1 7.96 122.9 1191 -5.04 5.04 0 180.00 -.00

T-INF P-INF Q-INF V-INF MU-INF RE/FT MREF STREF  
 (DEC R) (PISA) (PISA) (FT/SFC) (SLUGS/F<sup>3</sup>) (LR-SEC/F<sup>2</sup>) (FT-1) (R=.0175FT) (R=.0175FT)  
 8 .013 .577 3641 1.252E-05 7.014E-08 6.498E 05 1.837E-02 5.105E-02

CAMERA ROLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RMORCKK) T8AR1TO) BETA1TO)  
 TOP(T) 8223 76 .0475 5.645E-02 5.2385E-02  
 UPPER SIDE(US) 7766 113  
 LOWER SIDE(LS) 7504  
 HOTTER(H); 8234

OTC NO TIME DELTIME H(TO) H(TO)/MREF H(.9TO) HREF H(.85TO) HREF H(.85TO)/MREF ST(TO)

US 7744(113)	7.66	6.17	1.002E-03	.0545	1.237E-03	.0573	1.402E-03	.0763	2.762E-03
T 7711(113)	8.71	7.22	9.260E-04	.0504	1.143E-03	.0523	1.296E-03	.0706	2.555E-03
M 3654(113)	8.71	7.22	9.260E-04	.0504	1.143E-03	.0523	1.296E-03	.0706	2.555E-03
US 7747(113)	8.74	7.25	9.244E-04	.0503	1.143E-03	.0522	1.294E-03	.0705	2.551E-03
LS 1743(113)	8.74	7.25	9.244E-04	.0503	1.143E-03	.0522	1.294E-03	.0705	2.551E-03
T 7712(113)	9.79	8.30	8.639E-04	.0470	1.067E-03	.0581	1.209E-03	.0659	2.384E-03
M 3660(113)	9.79	8.30	8.639E-04	.0470	1.067E-03	.0581	1.209E-03	.0659	2.384E-03
LS 1744(113)	9.79	8.30	8.639E-04	.0470	1.067E-03	.0581	1.209E-03	.0659	2.384E-03
US 7745(113)	9.81	8.32	8.625E-04	.0470	1.065E-03	.0580	1.207E-03	.0658	2.380E-03
T 7713(113)	10.86	9.37	8.124E-04	.0443	1.009E-03	.0547	1.138E-03	.0620	2.243E-03
M 3651(113)	10.86	9.37	8.124E-04	.0443	1.009E-03	.0547	1.138E-03	.0620	2.243E-03
US 7746(113)	10.89	9.40	8.117E-04	.0442	1.009E-03	.0546	1.136E-03	.0618	2.238E-03
LS 1745(113)	10.89	9.40	8.117E-04	.0442	1.009E-03	.0546	1.136E-03	.0618	2.238E-03
T 7714(113)	11.56	10.47	7.688E-04	.0419	9.494E-04	.0517	1.076E-03	.0586	2.122E-03
US 7757(113)	11.56	10.47	7.688E-04	.0419	9.494E-04	.0517	1.076E-03	.0586	2.122E-03
M 3652(113)	11.56	10.47	7.688E-04	.0419	9.494E-04	.0517	1.076E-03	.0586	2.122E-03
LS 1746(113)	11.56	10.47	7.688E-04	.0419	9.494E-04	.0517	1.076E-03	.0586	2.122E-03
T 7715(113)	13.04	11.55	7.322E-04	.0398	9.041E-04	.0492	1.025E-03	.0558	2.017E-03
M 3663(113)	13.04	11.55	7.322E-04	.0398	9.041E-04	.0492	1.025E-03	.0558	2.017E-03
US 1747(113)	13.04	11.56	7.322E-04	.0398	9.041E-04	.0492	1.025E-03	.0558	2.017E-03
LS 1747(113)	13.04	11.56	7.322E-04	.0398	9.041E-04	.0492	1.025E-03	.0558	2.017E-03
T 7716(113)	14.12	12.63	7.033E-04	.0391	8.647E-04	.0471	9.802E-04	.0534	1.932E-03
US 7751(113)	14.12	12.63	7.033E-04	.0391	8.647E-04	.0471	9.802E-04	.0534	1.932E-03
M 3664(113)	14.12	12.63	7.033E-04	.0391	8.647E-04	.0471	9.802E-04	.0534	1.932E-03
LS 1748(113)	14.14	12.65	6.996E-04	.0381	8.639E-04	.0470	9.792E-04	.0533	1.929E-03
T 7717(113)	14.14	12.65	6.996E-04	.0381	8.639E-04	.0470	9.792E-04	.0533	1.929E-03

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6/29/73

AEDC(ARD, INC.) ARNOLD AFS, TENNESSEE  
VON KARMAN GAS DYNAMICS FACILITY  
50 INCH HYPERSONIC TUNNEL R

NASA-RI ORBITER HEATING

VA289

GROUP	CONFIG	MODEL	MACH NO	PO(PISA)	TO(DEC R)	ALPHA-MODEL	ALPHA-SECTOR	ALPHA-PREBEND	ROLL-MODEL	YAW
4	1	MATED	7.96	122.9	1191	-5.04	5.04	0	180.00	--00
T-1AF	P-1NF	Q-1NF	V-1NF	RNO-1NF	MU-1NF	RE/FT	HREF	STREF		
(DEC R)	(PISA)	(PISA)	(FT/SFC)	(SLUGS/FT <sup>3</sup> )	(LA-SEC/FT <sup>2</sup> )	(FT-1)	(R= .0175FT)	(R= .0175FT)		
87.1	.013	.577	36.1	1.252E-05	7.014E-08	6.498E 05	1.937E-02	5.105E-02		
CAPERA	ROLL NO	PAINT TEMP (DEG F)	INITIAL TEMP (DEG F)	SQUARE ROOT (RNO/CAK)	TBAR(10)	BETA(10)				
TOP(1)	8223									
UPPER SIDE(US)	7766									
LOWER SIDE(LS)	7908									
BOTTOM(B)	8234									

PIC NO	TIME	DELTIME	M(10)	M(10)/HREF	M(.970)	M(.970)/HREF	M(.85TO)	M(.85TO)/HREF	ST(10)
M 3565(113)	15.19	13.74	6.722E-04	.0366	8.301E-04	.0452	9.401E-04	.0512	1.853E-03
T 7717(113)	15.22	13.73	6.716E-04	.0366	8.293E-04	.0451	9.401E-04	.0512	1.852E-03
LS 1749(113)	15.22	13.73	6.716E-04	.0366	8.293E-04	.0451	9.401E-04	.0512	1.852E-03
US 7753(113)	15.24	13.75	6.710E-04	.0365	8.285E-04	.0451	9.392E-04	.0511	1.850E-03
T 7719(113)	16.29	14.81	6.467E-04	.0352	7.985E-04	.0435	9.053E-04	.0493	1.783E-03
M 3566(113)	16.29	14.81	6.467E-04	.0352	7.985E-04	.0435	9.053E-04	.0493	1.783E-03
LS 1750(113)	16.29	14.81	6.467E-04	.0352	7.985E-04	.0435	9.053E-04	.0493	1.783E-03
US 7754(113)	16.32	14.81	6.462E-04	.0352	7.979E-04	.0435	9.045E-04	.0493	1.783E-03
T 7719(113)	17.37	15.88	6.244E-04	.0340	7.711E-04	.0420	8.740E-04	.0476	1.720E-03
M 3567(113)	17.37	15.88	6.244E-04	.0340	7.711E-04	.0420	8.740E-04	.0476	1.720E-03
LS 1751(113)	17.37	15.88	6.239E-04	.0340	7.704E-04	.0420	8.734E-04	.0476	1.720E-03
US 7755(113)	17.40	15.91	6.043E-04	.0329	7.452E-04	.0406	8.458E-04	.0461	1.667E-03
T 7720(113)	18.45	16.96	6.043E-04	.0329	7.452E-04	.0406	8.458E-04	.0461	1.667E-03
LS 1752(113)	18.45	16.96	6.043E-04	.0329	7.452E-04	.0406	8.458E-04	.0461	1.667E-03
US 7756(113)	18.47	16.98	6.038E-04	.0329	7.450E-04	.0406	8.452E-04	.0460	1.665E-03
T 7721(113)	19.52	18.03	5.840E-04	.0319	7.236E-04	.0394	8.202E-04	.0447	1.616E-03
M 3568(113)	19.52	18.03	5.840E-04	.0319	7.236E-04	.0394	8.202E-04	.0447	1.616E-03
LS 1753(113)	19.55	18.04	5.856E-04	.0319	7.231E-04	.0394	8.194E-04	.0446	1.614E-03
US 7757(113)	20.40	19.11	5.642E-04	.0310	7.029E-04	.0382	7.968E-04	.0434	1.569E-03
T 7722(113)	20.42	19.13	5.642E-04	.0310	7.029E-04	.0382	7.968E-04	.0433	1.567E-03
LS 1754(113)	20.42	19.13	5.642E-04	.0310	7.029E-04	.0382	7.968E-04	.0433	1.567E-03
US 7758(113)	21.70	20.21	5.535E-04	.0301	6.835E-04	.0372	7.744E-04	.0422	1.526E-03
T 7723(113)	21.70	20.21	5.535E-04	.0301	6.835E-04	.0372	7.744E-04	.0422	1.526E-03
LS 1755(113)	21.70	20.21	5.535E-04	.0301	6.835E-04	.0372	7.744E-04	.0422	1.526E-03

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NASA-RI ORBITER HEATING  
 VA289

AEDC(DDO, INC.), ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL R

GROUP CONFIG MODEL MACH NO PO(PISA) TO(CEG R) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREREND ROLL-MODEL YAW  
 4 1 7.96 122.9 1191 -5.04 5.04 0 180.00 -0.00  
 T-INF P-INF Q-INF V-INF RMO-INF MU-INF HREF STREF  
 (DEG R) (PSIA) (FT/SFC) (SLUGS/FT<sup>3</sup>) (LBS-SEC/FT<sup>2</sup>) (FT-1) (R= .0175FT) (R= .0175FT)  
 87.1 .013 .577 36.0 1.252E-05 7.013E-08 6.499E 05 1.417E-02 5.104E-02  
 CAMERA ROLL NO PAINT IFMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RMCCKX) TRAR(TO) BETA(TO)  
 TOP(T) 8223 76 .0475 5.646E-02 5.2385E-02  
 UP-ER SIDE(US) 7166  
 LO-ER SIDE(LS) 7908  
 BOTTOM(B) 8234

PIC NO	TIME	DELTIME	H(TO)	HREF	M(.9TO)	M(.9TO)/HREF	M(.85TO)	M(.85TO)/HREF	ST(TO)
US 7759(113)	21.72	20.24	5.532E-04	.0301	6.831E-04	.0372	7.743E-04	.0421	1.524E-03
T 7724(113)	22.78	21.29	5.343E-04	.0293	6.660E-04	.0362	7.549E-04	.0411	1.486E-03
H 3572(113)	22.78	21.29	5.343E-04	.0293	6.660E-04	.0362	7.549E-04	.0411	1.486E-03
LS 1754(113)	22.78	21.29	5.343E-04	.0293	6.660E-04	.0362	7.549E-04	.0411	1.486E-03
US 7767(113)	22.60	21.31	5.390E-04	.0293	6.660E-04	.0362	7.549E-04	.0411	1.486E-03
T 7725(113)	23.65	22.34	5.262E-04	.0286	6.498E-04	.0354	7.365E-04	.0401	1.451E-03
H 3573(113)	23.65	22.34	5.262E-04	.0286	6.498E-04	.0354	7.365E-04	.0401	1.451E-03
LS 1761(113)	23.68	22.39	5.259E-04	.0286	6.498E-04	.0354	7.365E-04	.0401	1.451E-03
US 7761(113)	23.68	22.39	5.259E-04	.0286	6.498E-04	.0354	7.365E-04	.0401	1.451E-03
T 7726(113)	25.18	23.69	5.112E-04	.0278	6.313E-04	.0344	7.156E-04	.0390	1.409E-03
H 3574(113)	25.18	23.69	5.112E-04	.0278	6.313E-04	.0344	7.156E-04	.0390	1.409E-03
LS 1762(113)	25.20	23.71	5.110E-04	.0278	6.310E-04	.0343	7.152E-04	.0389	1.409E-03
US 7762(113)	25.20	23.71	5.110E-04	.0278	6.310E-04	.0343	7.152E-04	.0389	1.409E-03
T 7727(113)	27.26	25.77	4.912E-04	.0267	6.053E-04	.0329	6.862E-04	.0373	1.351E-03
H 3575(113)	27.26	25.77	4.912E-04	.0267	6.053E-04	.0329	6.862E-04	.0373	1.351E-03
LS 1754(113)	27.26	25.77	4.902E-04	.0267	6.053E-04	.0329	6.862E-04	.0373	1.351E-03
US 7763(113)	27.26	25.77	4.900E-04	.0267	6.050E-04	.0330	6.858E-04	.0374	1.352E-03
T 7728(113)	29.33	27.84	4.715E-04	.0257	5.823E-04	.0317	6.501E-04	.0359	1.306E-03
H 3576(113)	29.33	27.84	4.716E-04	.0257	5.823E-04	.0317	6.501E-04	.0359	1.306E-03
LS 1764(113)	29.36	27.87	4.713E-04	.0256	5.820E-04	.0317	6.501E-04	.0359	1.306E-03
US 7764(113)	29.36	27.87	4.713E-04	.0256	5.820E-04	.0317	6.501E-04	.0359	1.306E-03
T 7729(113)	31.34	29.85	4.555E-04	.0248	5.624E-04	.0306	6.376E-04	.0347	1.255E-03
H 3577(113)	31.34	29.85	4.555E-04	.0248	5.624E-04	.0306	6.376E-04	.0347	1.255E-03
LS 1765(113)	31.36	29.87	4.553E-04	.0248	5.622E-04	.0306	6.373E-04	.0347	1.254E-03
US 7765(113)	31.36	29.87	4.553E-04	.0248	5.622E-04	.0306	6.373E-04	.0347	1.254E-03

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 6/29/73

# NASA-NI ORBITER HEATING

VA289

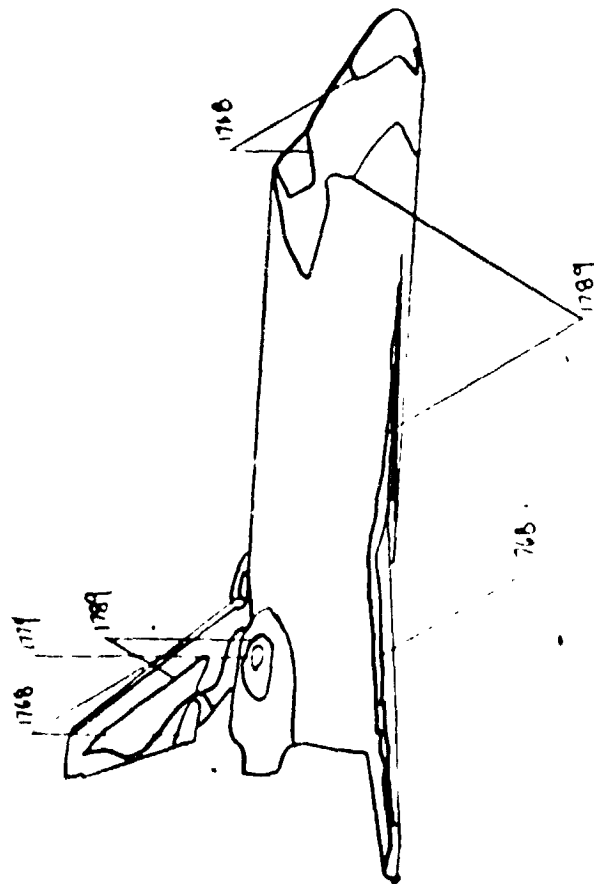
AEDC (AO-INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL R

GROUP CONFIG MODEL MACH NO PO(PSIA) TO( DEG R) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREBEND ROLL-MODEL YAW  
 4 1 1 7.96 123.0 1190 -5.04 5.04 0 180.00 -0.00  
 T-INF P-INF Q-INF V-INF MU-INF RE/FT MREF STREF  
 (DEG R) (PSIA) (PSIA) (FT/SEC) (SLUGS/FT<sup>3</sup>) (LR-SEC/FT<sup>2</sup>) (FT-1) (R= .0175FT) (R= .0175FT)  
 87.1 .013 .577 3639 1-25AE-05 7.010E-08 6.510E-05 1.937E-02 5.101E-02  
 CAMERA ROLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHOCXK) TRAR(ITO) BETA(ITO)  
 TOP(IT) 8223  
 UPPER SIDE(US) 7766  
 LOWER SIDE(LS) 750A  
 BOTTOM(B) 8234  
 .0475 5.646E-02 5.2385E-02

PIC NO TIME DELTIME M(ITO) M(ITO)/MREF M(.9TO) MREF M(.85TO) MREF ST(ITO)  
 T 7730(113) 33.41 31.92 4.404E-04 .0240 5.438E-04 .0296 6.165E-04 .0336 1.214E-03  
 M 7578(113) 33.41 31.92 4.404E-04 .0240 5.438E-04 .0296 6.165E-04 .0336 1.214E-03  
 US 7766(113) 33.44 31.95 4.402E-04 .0240 5.436E-04 .0296 6.162E-04 .0336 1.215E-03  
 LS 1762(113) 33.44 31.95 4.402E-04 .0240 5.434E-04 .0296 6.162E-04 .0336 1.215E-03  
 MODEL HAS LEFT CENTERLINE  
 M 7579(113) 35.49 34.00 4.247E-04 .0232 5.269E-04 .0287 5.973E-04 .0325 1.176E-03  
 T 7731(113) 35.52 34.03 4.266E-04 .0232 5.268E-04 .0287 5.971E-04 .0325 1.176E-03  
 LS 1763(113) 35.52 34.03 4.266E-04 .0232 5.268E-04 .0287 5.971E-04 .0325 1.176E-03  
 US 7767(113) 35.54 34.05 4.264E-04 .0232 5.266E-04 .0287 5.969E-04 .0325 1.176E-03

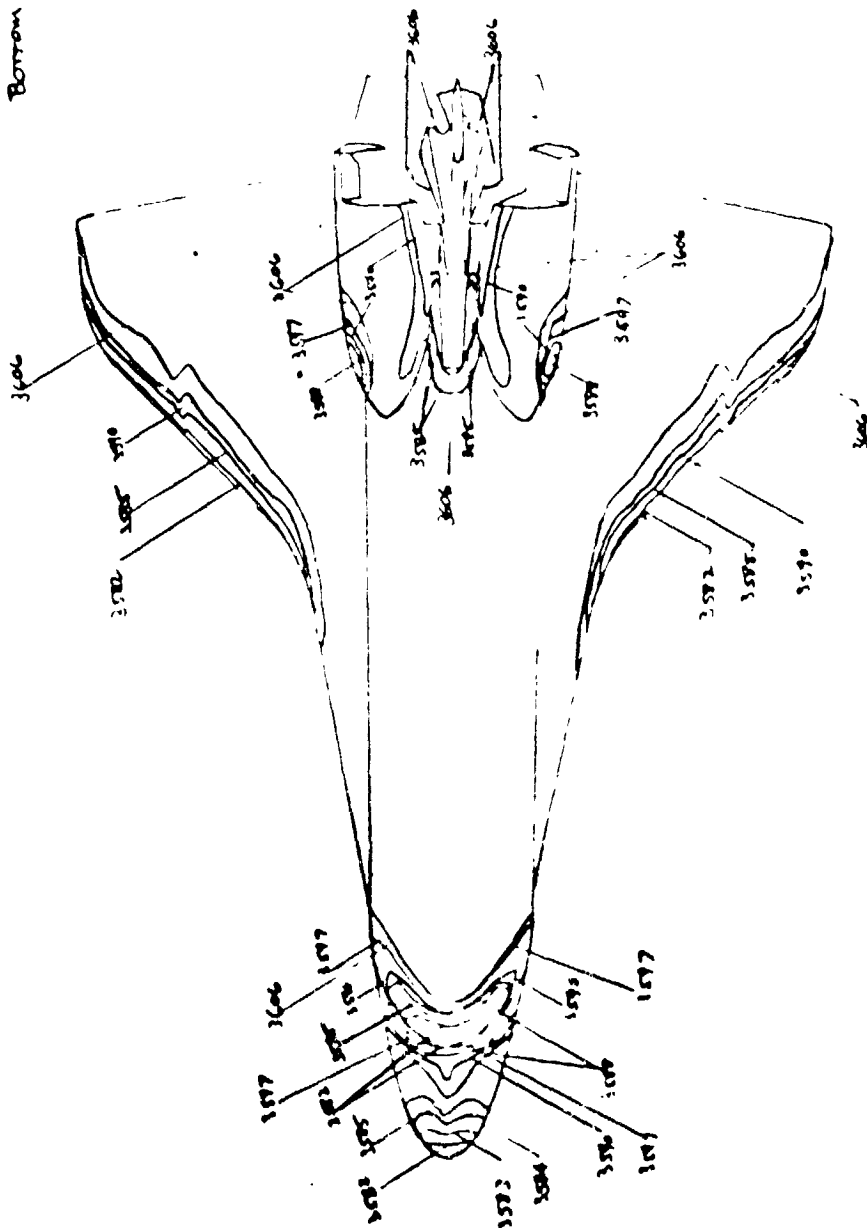


Group 5  
7908  
Lower Side  
WJ



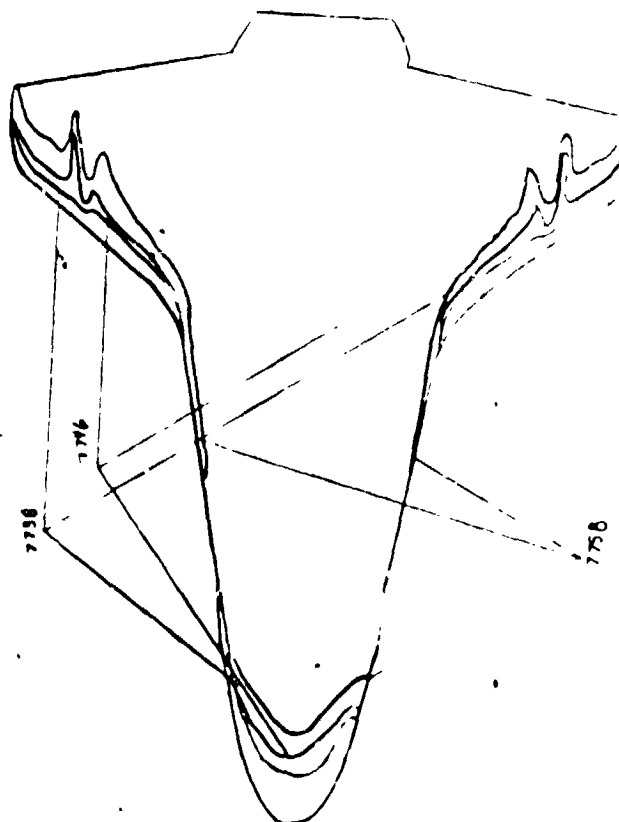


8234  
GP 5  
Bottom



C 306

Graph 5  
Top  
8223  
ms



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NASA-RI ORBITER HEATING  
 VA289  
 AECI(AROS-INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL R

GROUP	CONFIG	MODEL	MACH NO	PO(PSTA)	TO(DEG R)	ALPHA-MODEL	ALPHA-SECTOR	ALPHA-PREBEND	ROLL-MODEL	YAW
5	2	ORBITER S	7.96	122.0	1195	-.04	.04	0	180.00	-.00
T-INF	P-INF	Q-INF	V-INF	RMO-INF	MU-INF	RE/FT	MREF	STREF		
(DEG R)	(PSTA)	(PSTA)	(FT/SEC)	(SLUGS/FT <sup>2</sup> )	(LB-SEL/FT <sup>2</sup> )	(FT-1)	(R= .0175FT)	(R= .0175FT)		
87.4	.13	.572	36.4	1.239E-05	7.035E-08	6.422E 05	1.431E-02	5.133E-02		
CAMERA	ROLL NO	PAINT TEMP (DEG F)	INITIAL TEMP (DEG F)	SQUARE ROOT (RHOXCK)	TBAR(TOI)	BETA(TOI)				
TOP(T)	8223		78	.0486	8.073E-02	7.6418E-02				
UPPER SIDE(US)	7766	131								
LOWER SIDE(LS)	7908									
BOTTOM(B)	8234									

PTC NO	TIME	DELTIME	M(TOI)	M(TOI)/MREF	M(.9TO)	M(.9TO)/MREF	M(.85TO)	M(.85TO)/MREF	ST(TOI)
US 7774(131)	7.66	6.17	1.495E-03	.0816	1.857E-03	.1014	2.112E-03	.1153	4.151E-03
T 7739(131)	8.71	7.22	1.382E-03	.0755	1.716E-03	.0937	1.952E-03	.1066	3.840E-03
A 7587(131)	8.71	7.22	1.382E-03	.0755	1.716E-03	.0937	1.952E-03	.1066	3.840E-03
US 7775(131)	8.74	7.25	1.340E-03	.0753	1.713E-03	.0935	1.949E-03	.1063	3.827E-03
LS 1771(131)	8.74	7.25	1.340E-03	.0753	1.713E-03	.0935	1.949E-03	.1063	3.827E-03
T 7740(131)	9.79	8.34	1.249E-03	.0703	1.601E-03	.0873	1.821E-03	.0993	3.574E-03
M 7583(131)	9.79	8.34	1.249E-03	.0703	1.601E-03	.0873	1.821E-03	.0993	3.574E-03
US 7776(131)	9.81	8.32	1.249E-03	.0703	1.601E-03	.0873	1.821E-03	.0993	3.574E-03
LS 1772(131)	9.81	8.32	1.249E-03	.0703	1.601E-03	.0873	1.821E-03	.0993	3.574E-03
M 7589(131)	10.86	9.37	1.213E-03	.0662	1.506E-03	.0821	1.711E-03	.0933	3.358E-03
T 7741(131)	10.89	9.40	1.211E-03	.0661	1.504E-03	.0821	1.711E-03	.0933	3.358E-03
US 7777(131)	10.89	9.40	1.211E-03	.0661	1.504E-03	.0821	1.711E-03	.0933	3.358E-03
LS 1773(131)	10.89	9.40	1.211E-03	.0661	1.504E-03	.0821	1.711E-03	.0933	3.358E-03
M 7591(131)	11.54	10.45	1.149E-03	.0626	1.425E-03	.0777	1.621E-03	.0845	3.180E-03
T 7742(131)	11.56	10.47	1.149E-03	.0626	1.425E-03	.0777	1.621E-03	.0845	3.180E-03
US 7778(131)	11.56	10.47	1.149E-03	.0626	1.425E-03	.0777	1.621E-03	.0845	3.180E-03
LS 1774(131)	11.56	10.47	1.149E-03	.0626	1.425E-03	.0777	1.621E-03	.0845	3.180E-03
M 7591(131)	13.01	11.53	1.044E-03	.0594	1.359E-03	.0741	1.545E-03	.0843	3.029E-03
US 7779(131)	13.01	11.53	1.044E-03	.0594	1.359E-03	.0741	1.545E-03	.0843	3.029E-03
LS 1775(131)	13.04	11.55	1.043E-03	.0596	1.357E-03	.0740	1.544E-03	.0842	3.026E-03
M 7592(131)	14.12	12.63	1.045E-03	.0570	1.298E-03	.0708	1.476E-03	.0805	2.894E-03
US 7780(131)	14.12	12.63	1.045E-03	.0570	1.298E-03	.0708	1.476E-03	.0805	2.894E-03
LS 1776(131)	14.12	12.63	1.045E-03	.0570	1.298E-03	.0708	1.476E-03	.0805	2.894E-03
M 7593(131)	14.14	12.65	1.044E-03	.0569	1.297E-03	.0707	1.475E-03	.0804	2.891E-03

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6/29/73

NASA-RI ORBITER HEATING

AEDC(ARO, INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL R

VA289

GROUP CONFIG MODEL MACH NO PO(PSIA) TO(DEG R) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREBEND ROLL-MODEL YAW  
 5 2 ORBITER S 7.96 122.4 1195 -.04 .04 0 180.00 -.00

T-INF P-INF Q-INF V-INF RHO-INF MU-INF RE/FT HREF STREF  
 (DEG R) (PSIA) (PSIA) (FT/SEC) (SLUGS/FT<sup>3</sup>) (LR-SEC/FT<sup>2</sup>) (FT-1) (R=.0175FT) (H=.0175FT)  
 87.4 .013 .574 36.6 1.243E-05 7.034E-08 6.444E 05 1.834E-02 5.124E-02

CAMERA ROLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHO\*CKX) TRAR(ITO) BETA(ITO)  
 TOP(IT) 823 78 .04RA 8.073E-02 7.6418E-02  
 UPPER SIDE(US) 7766  
 LOWER SIDE(LS) 7908  
 BOTTOM(B) 8234

PIC NO TIME DELTIME H(TO) HREF H(TO)/HREF H(-9TO)/HREF H(-85TO) K(-85TO)/HREF SY(ITO)

T 7745(131)	15.19	13.70	1.003E-03	.0547	1.246E-03	.0679	1.417E-03	.0773	2.778E-03
US 7745(131)	15.19	13.70	1.003E-03	.0547	1.246E-03	.0679	1.417E-03	.0773	2.778E-03
LS 7745(131)	15.19	13.70	1.003E-03	.0547	1.246E-03	.0679	1.417E-03	.0773	2.778E-03
T 7746(131)	15.22	13.73	1.002E-03	.0546	1.245E-03	.0678	1.416E-03	.0772	2.774E-03
US 7746(131)	15.22	13.73	1.002E-03	.0546	1.245E-03	.0678	1.416E-03	.0772	2.774E-03
LS 7746(131)	15.22	13.73	1.002E-03	.0546	1.245E-03	.0678	1.416E-03	.0772	2.774E-03
T 7747(131)	16.27	14.74	9.661E-04	.0526	1.200E-03	.0654	1.365E-03	.0743	2.671E-03
US 7747(131)	16.27	14.74	9.661E-04	.0526	1.200E-03	.0654	1.365E-03	.0743	2.671E-03
LS 7747(131)	16.27	14.74	9.661E-04	.0526	1.200E-03	.0654	1.365E-03	.0743	2.671E-03
T 7748(131)	16.29	14.80	9.652E-04	.0526	1.199E-03	.0654	1.363E-03	.0743	2.673E-03
US 7748(131)	16.29	14.80	9.652E-04	.0526	1.199E-03	.0654	1.363E-03	.0743	2.673E-03
LS 7748(131)	16.29	14.80	9.652E-04	.0526	1.199E-03	.0654	1.363E-03	.0743	2.673E-03
T 7749(131)	17.34	15.86	9.327E-04	.0508	1.158E-03	.0631	1.318E-03	.0718	2.581E-03
US 7749(131)	17.34	15.86	9.327E-04	.0508	1.158E-03	.0631	1.318E-03	.0718	2.581E-03
LS 7749(131)	17.34	15.86	9.327E-04	.0508	1.158E-03	.0631	1.318E-03	.0718	2.581E-03
T 7750(131)	17.37	15.88	9.320E-04	.0504	1.157E-03	.0631	1.316E-03	.0717	2.577E-03
US 7750(131)	17.37	15.88	9.320E-04	.0504	1.157E-03	.0631	1.316E-03	.0717	2.577E-03
LS 7750(131)	17.37	15.88	9.320E-04	.0504	1.157E-03	.0631	1.316E-03	.0717	2.577E-03
T 7751(131)	18.42	16.93	9.026E-04	.0491	1.121E-03	.0610	1.275E-03	.0694	2.493E-03
US 7751(131)	18.42	16.93	9.026E-04	.0491	1.121E-03	.0610	1.275E-03	.0694	2.493E-03
LS 7751(131)	18.42	16.93	9.026E-04	.0491	1.121E-03	.0610	1.275E-03	.0694	2.493E-03
T 7752(131)	18.45	16.94	9.019E-04	.0492	1.120E-03	.0610	1.274E-03	.0694	2.493E-03
US 7752(131)	18.45	16.94	9.019E-04	.0492	1.120E-03	.0610	1.274E-03	.0694	2.493E-03
LS 7752(131)	18.45	16.94	9.019E-04	.0492	1.120E-03	.0610	1.274E-03	.0694	2.493E-03
T 7753(131)	19.50	18.01	8.752E-04	.0477	1.087E-03	.0592	1.236E-03	.0674	2.421E-03
US 7753(131)	19.50	18.01	8.752E-04	.0477	1.087E-03	.0592	1.236E-03	.0674	2.421E-03
LS 7753(131)	19.50	18.01	8.752E-04	.0477	1.087E-03	.0592	1.236E-03	.0674	2.421E-03
T 7754(131)	19.52	18.03	8.746E-04	.0476	1.086E-03	.0591	1.235E-03	.0673	2.416E-03
US 7754(131)	19.52	18.03	8.746E-04	.0476	1.086E-03	.0591	1.235E-03	.0673	2.416E-03
LS 7754(131)	19.52	18.03	8.746E-04	.0476	1.086E-03	.0591	1.235E-03	.0673	2.416E-03
T 7755(131)	20.57	19.08	8.501E-04	.0463	1.054E-03	.0575	1.201E-03	.0654	2.347E-03
US 7755(131)	20.57	19.08	8.501E-04	.0463	1.054E-03	.0575	1.201E-03	.0654	2.347E-03
LS 7755(131)	20.57	19.08	8.501E-04	.0463	1.054E-03	.0575	1.201E-03	.0654	2.347E-03
T 7756(131)	20.57	19.08	8.496E-04	.0463	1.055E-03	.0575	1.200E-03	.0654	2.349E-03
US 7756(131)	20.57	19.11	8.496E-04	.0463	1.055E-03	.0575	1.200E-03	.0654	2.349E-03
LS 7756(131)	20.57	19.11	8.496E-04	.0463	1.055E-03	.0575	1.200E-03	.0654	2.349E-03
T 7757(131)	21.65	20.16	8.271E-04	.0450	1.027E-03	.0559	1.168E-03	.0636	2.285E-03

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MECDIARO, INC.) ARNOLD AFS, TENNESSEE  
VON KARMAN GAS DYNAMICS FACILITY  
50 INCH HYPERSONIC TUNNEL A

**NASA-R1 ORBITER HEATING**

WA299

GROUP	CONFIG	MODEL	MACH NO	DP(PSTA)	TO( DEG R)	ALPHA-MODEL	ALPHA-SECTOR	ALPHA-PREBEND	ROLL-MODEL	YAW
5	2	ORBITER S	7.96	122.7	1195	-.04	.04	0	180.00	-.00

T-INF	P-INF	Q-INF	V-INF	RHO-INF	WU-INF	RE/FT	WREF	STREF
(MEGR)	(PSTA)	(PSTA)	(FT/SEC)	(SLUGS/FT <sup>3</sup> )	(LA-SEC/FT <sup>2</sup> )	(FT-1)	(R=	(R=
87.4	.013	.576	3646	1.246E-05	7.035E-08	6.459E 05	1.030E-02	5.110E-02

[illegible]

TOP (1)	8223		
UPPER SINE(US)	7766	78	8.073E-02 7.6418E-02

Upper 51m

LOWFA SINE(LS) 790A

**HOYTOM (B)**

PIC NO	TIME DELTIME	M(TD)	M(TD)/HREF	M(1.9T0)	M(1.9T0)/HREF	M(1.85T0)	M(1.85T0)/HREF	ST(1T0)
US 7751(131)	21.67 20.19	A.266E-04	0.450	1.027E-03	0.559	1.168E-03	0.636	2.284E-03
US 7787(131)	21.67 20.19	A.266E-04	0.450	1.027E-03	0.559	1.168E-03	0.636	2.284E-03
US 1793(131)	21.67 20.19	A.266E-04	0.450	1.027E-03	0.559	1.168E-03	0.636	2.284E-03
US 3600(131)	22.73 21.24	A.059F-04	0.439	1.001E-03	0.545	1.138E-03	0.620	2.225E-03
US 7752(131)	22.75 21.26	A.054E-04	0.439	1.000E-03	0.545	1.138E-03	0.620	2.225E-03
US 1784(131)	22.75 21.26	A.054E-04	0.439	1.000E-03	0.545	1.138E-03	0.620	2.225E-03
US 7788(131)	22.78 21.29	A.050F-04	0.434	9.997E-04	0.544	1.137E-03	0.619	2.225E-03
US 7753(131)	24.53 23.04	7.738E-04	0.421	9.609E-04	0.523	1.093E-03	0.595	2.136E-03
US 3601(131)	24.53 23.04	7.738E-04	0.421	9.609E-04	0.523	1.093E-03	0.595	2.136E-03
US 1785(131)	24.53 23.04	7.738E-04	0.421	9.609E-04	0.523	1.093E-03	0.595	2.136E-03
US 7789(131)	24.55 23.06	7.733E-04	0.421	9.604E-04	0.523	1.092E-03	0.595	2.135E-03
US 3602(131)	26.61 25.12	7.411E-04	0.403	9.203E-04	0.501	1.047E-03	0.569	2.042E-03
US 7790(131)	26.63 25.14	7.407E-04	0.403	9.198E-04	0.501	1.046E-03	0.570	2.045E-03
US 1786(131)	26.63 25.14	7.437E-04	0.403	9.198E-04	0.501	1.046E-03	0.570	2.044E-03
US 7755(131)	28.71 27.22	7.119E-04	0.387	8.840E-04	0.481	1.006E-03	0.547	1.962E-03
US 3603(131)	28.71 27.22	7.119E-04	0.387	8.840E-04	0.481	1.006E-03	0.547	1.962E-03
US 1787(131)	28.71 27.22	7.119E-04	0.387	8.840E-04	0.481	1.006E-03	0.547	1.962E-03
US 7791(131)	28.73 27.24	7.115E-04	0.387	8.836E-04	0.481	1.005E-03	0.547	1.964E-03
US 7756(131)	30.79 29.30	6.862E-04	0.373	8.521E-04	0.463	9.693E-04	0.527	1.891E-03
US 3604(131)	30.79 29.30	6.862E-04	0.373	8.521E-04	0.463	9.693E-04	0.527	1.891E-03
US 1788(131)	30.79 29.30	6.862E-04	0.373	8.521E-04	0.463	9.693E-04	0.527	1.891E-03
US 7792(131)	30.81 29.32	6.859F-04	0.373	8.519E-04	0.463	9.688E-04	0.527	1.889E-03
US 3605(131)	32.66 31.37	6.631E-04	0.360	8.234E-04	0.448	9.366E-04	0.509	1.826E-03
US 1789(131)	32.69 31.40	6.628E-04	0.360	8.231E-04	0.447	9.362E-04	0.509	1.825E-03
US 7757(131)	32.89 31.40	6.628E-04	0.360	8.231E-04	0.447	9.362E-04	0.509	1.825E-03
US 7793(131)	32.89 31.40	6.628E-04	0.360	8.231E-04	0.447	9.362E-04	0.509	1.825E-03

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AEPC (ARO, INC.) ARNOLD AFS, TENNESSEE  
VON KARMAN GAS DYNAMICS FACILITY  
50 INCH HYPERSONIC TUNNEL A

OLL-MODEL	YAW
180.00	-0.00

QLL-MODEL YAW -0.0  
180.00

T-INF	P-INF	Q-INF	V-INF	RMO-INF	MU-INF	RE/FT	MREF	STREF
(DEG R)	(PSIA)	(PSIA)	(FT/SEC)	(SLUGS/FT <sup>3</sup> )	(L-SEC/FT <sup>2</sup> )	(L-T-1)	(R=	(R=
87.4	.013	.578	3646	1.265E-05	7.036E-08	6.478E 05	1.839E-02	5.110E-02

CAMERA	ROLL NO	PAINT TEMP (DEG F)	INITIAL TEMP (DEG F)	SQUARE ROOT (RHOXCXK)	YBAR(TO)	BETA(TO)

TOP(T)	8223			
WPEFQ	SINE(US)	7766	131	78
				.0485
				8.073E-02
				7.6418E-02

8.073E-02 7.6418E-02

• 0495

31

131

301

536-411

1

1

PIC NO	TIME DELTIME	H1(0)	H1(0)/HREF	H1(9T0)	H1(85T0)	H1(85T0)/HREF	S1(T0)
T 7759(131)	34.54	6.421E-04	0.345	7.974E-04	9.071E-04	0.493	1.717E-03
M 7605(131)	33.45	6.421E-04	0.345	7.974E-04	9.071E-04	0.493	1.761E-03
M 7759(131)	34.54	6.421E-04	0.345	7.974E-04	9.071E-04	0.493	1.767E-03
LS 1790(131)	33.45	6.421E-04	0.345	7.974E-04	9.071E-04	0.493	1.768E-03
LS 7794(131)	34.57	6.419E-04	0.349	7.971E-04	9.067E-04	0.493	1.768E-03
US 7759(131)	35.22	MODEL HAS LEFT CENTERLINE					
T 7759(131)	37.02	6.231E-04	0.339	7.738E-04	8.802E-04	0.478	1.714E-03
M 3607(131)	37.02	6.231E-04	0.339	7.738E-04	8.802E-04	0.478	1.714E-03
M 7759(131)	37.02	6.231E-04	0.339	7.738E-04	8.802E-04	0.478	1.714E-03
LS 1790(131)	37.02	6.229E-04	0.338	7.735E-04	8.798E-04	0.478	1.713E-03

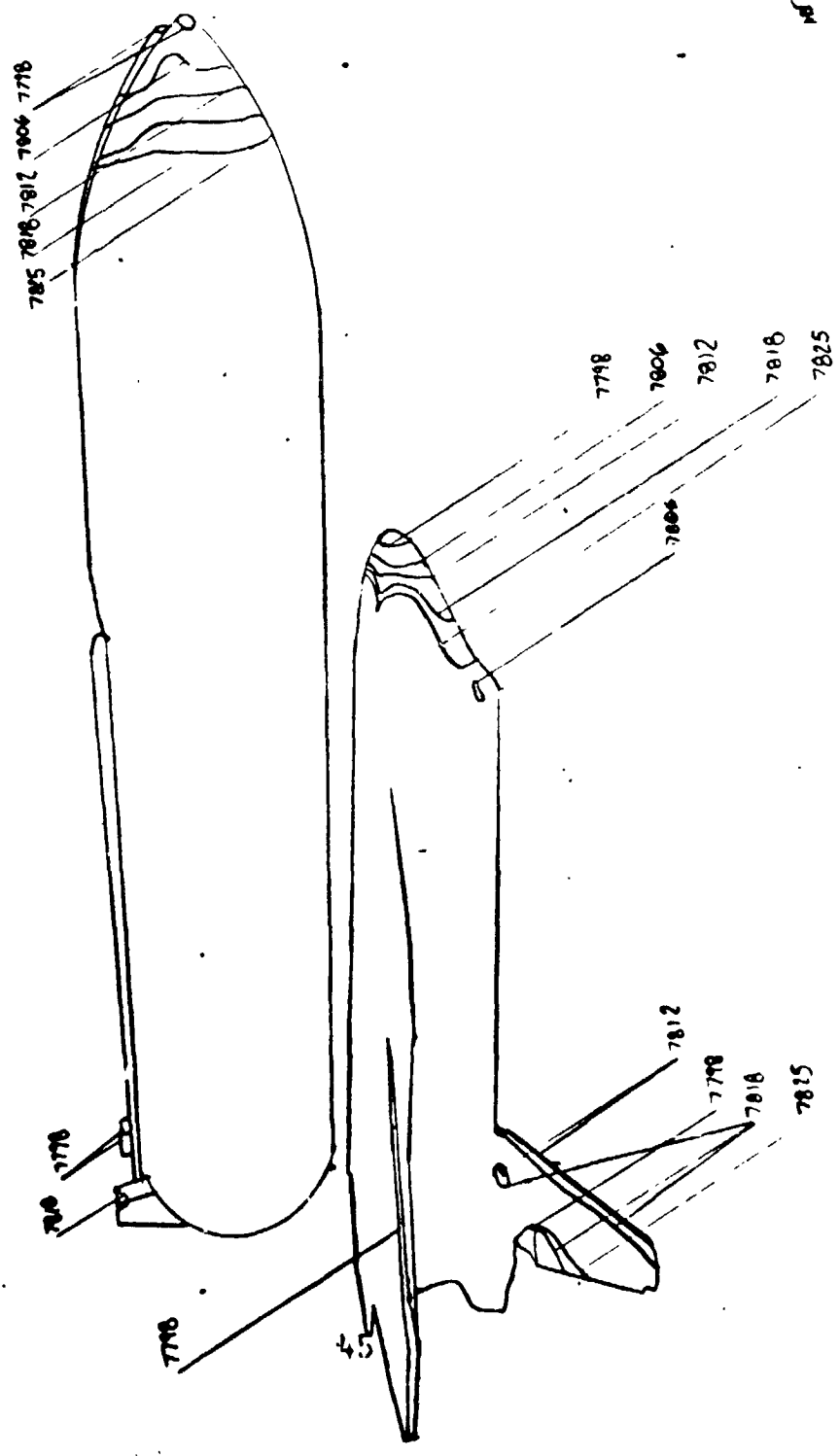
MODEL HAS LEFT CENTRAL LINE

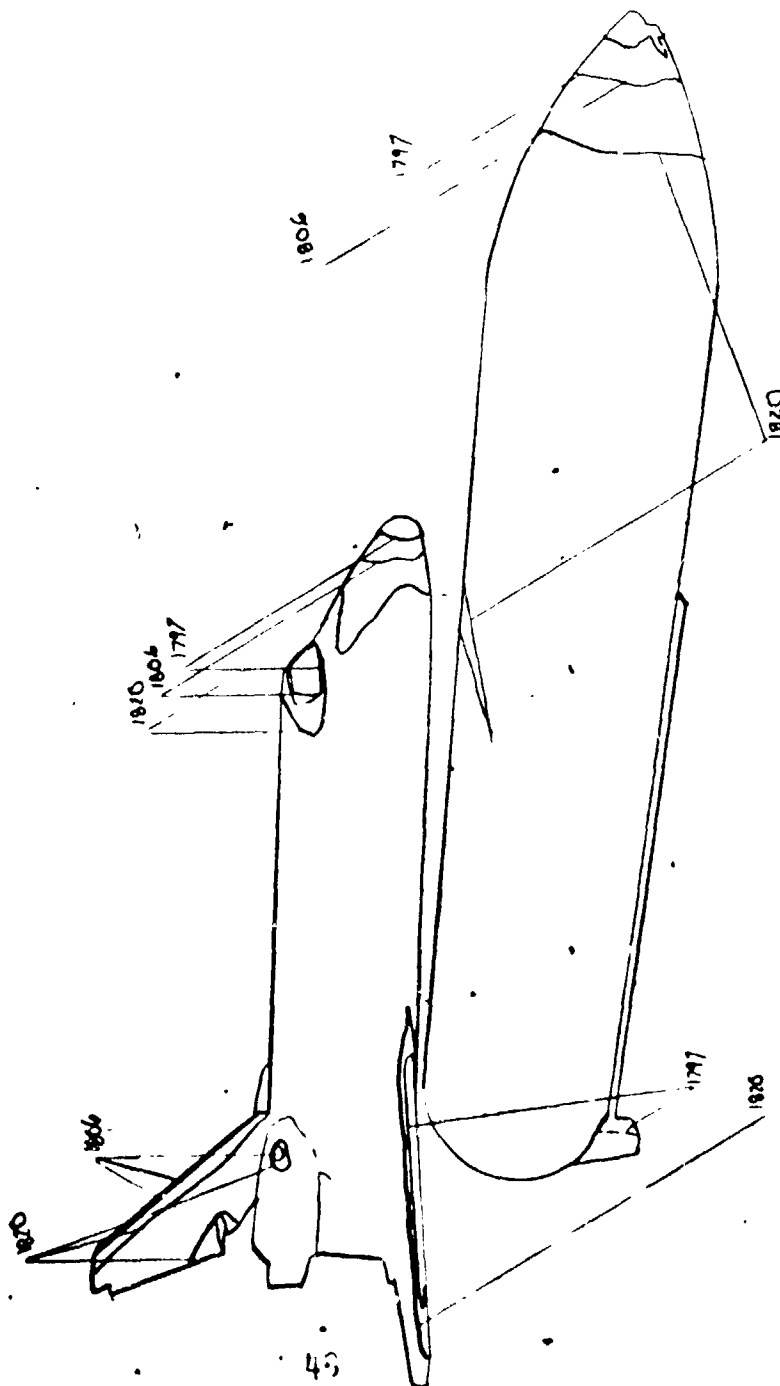
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18.4  
14.3

2

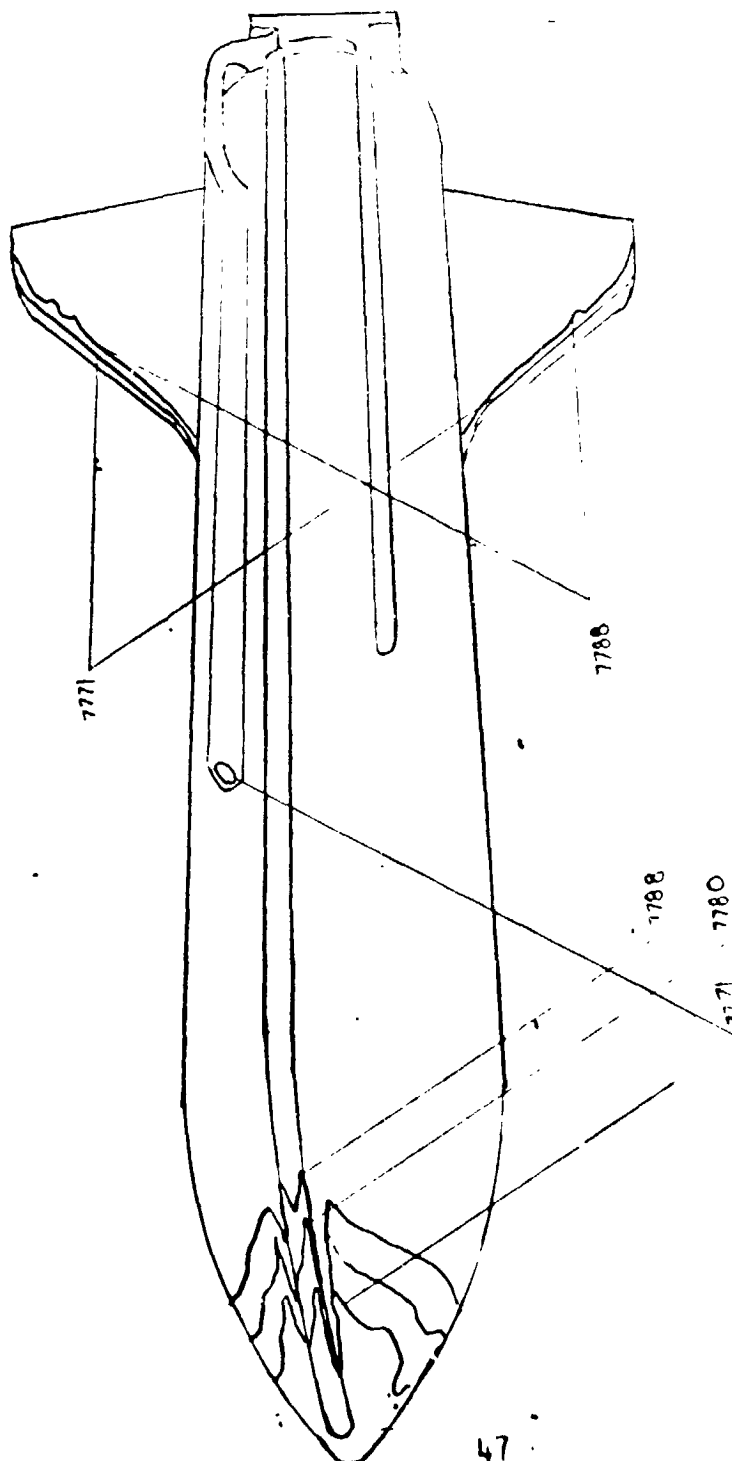
2411 500

7766  
GP 6  
Upper Side

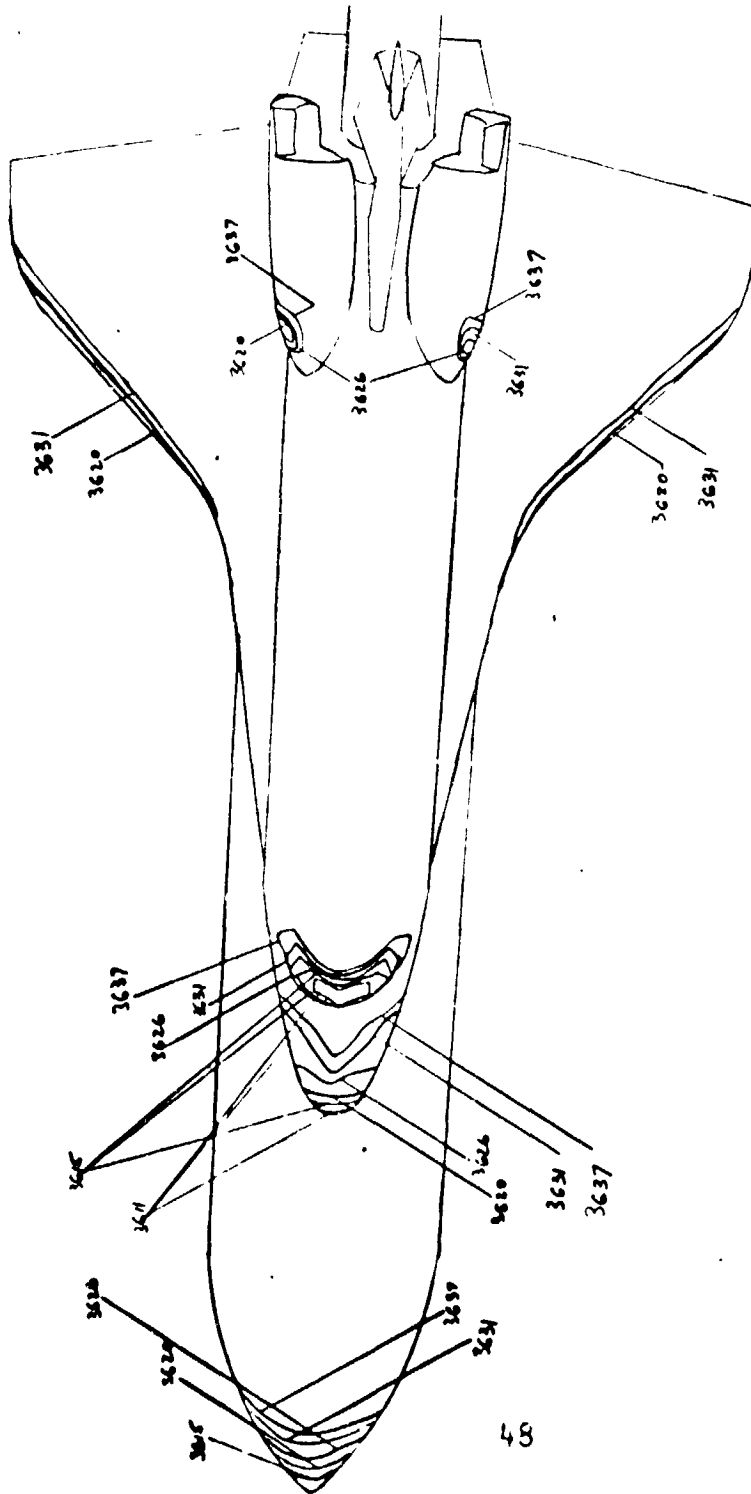




Group 6  
8223  
W  
Top



8234  
GPO  
Bottom



2wC

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 6/29/73

NASA-RI ORBITER PEATING  
 VA289  
 AEDC(ARO-INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL R

GROUP	CONFIG	MODEL	MACH NO	PO(PSTIA)	TO(DEG R)	ALPHA-MODEL	ALPHA-SECTOR	ALPHA-PREBEND	ROLL-MODEL	YAW
6	1	MATED	7.96	123.0	1206	-0.4	0.4	0	180.00	-0.00
T-INF	P-INF	Q-INF	V-INF	RHO-INF	MU-INF	RE/FT	HREF	STREF		
(DEG R)	(PSTIA)	(PSTIA)	(FT/SEC)	(SLUGS/FT <sup>3</sup> )	(LH-SEC/FT <sup>2</sup> )	(FT-1)	(R <sup>2</sup> .0175FT)	(R <sup>2</sup> .0175FT)		
88.2	.013	.577	3663	1.238E-05	7.100F-08	6.286E 05	1.842E-02	5.141E-02		
CAMERA	ROLL NO	PAINT TEMP (DEG F)	INITIAL TEMP (DEG F)	SQUARE ROOT (RHOXCKI)	TBAR(ITO)	BETA(ITO)				
TOP(IT)	8223		78	-0.0519	0	0				
UPPER SIDE(US)	7766		200							
LOWER SIDE(LS)	7908									
MOTOM(8)	8234									

PIC NO	TIME DELTIME	H(TO)	H(TO)/HREF	M(.9TO)	M(.9TO)/HREF	M(.85TO)	M(.85TO)/HREF	ST(ITO)
T 7760(200)	1.15	MODEL HAS NOT REACHED CENTERLINE	9.290E-03	.5043	1.074E-02	.5831	2.014E-02	
A 3608(200)	1.15	MODEL HAS NOT REACHED CENTERLINE	9.226E-03	.5006	1.067E-02	.5789	1.999E-02	
LS 1792(200)	1.15	MODEL HAS NOT REACHED CENTERLINE	9.226E-03	.5006	1.067E-02	.5789	1.999E-02	
US 7796(200)	1.18	MODEL HAS NOT REACHED CENTERLINE	9.164E-03	.4976	1.050E-02	.5751	1.989E-02	
T 7761(200)	2.23	MODEL HAS NOT REACHED CENTERLINE	7.328E-03	.3978	8.474E-03	.4600	1.589E-02	
M 3609(200)	2.23	MODEL HAS NOT REACHED CENTERLINE	7.328E-03	.3978	8.474E-03	.4600	1.589E-02	
US 7797(200)	2.25	MODEL HAS NOT REACHED CENTERLINE	7.328E-03	.3978	8.474E-03	.4600	1.589E-02	
LS 1793(200)	2.25	MODEL HAS NOT REACHED CENTERLINE	7.328E-03	.3978	8.474E-03	.4600	1.589E-02	
INJECT TIME = 2.65								
M 3610(200)	3.30	7.314E-03	.3970	.5043	1.074E-02	.5831	2.014E-02	
T 7762(200)	3.33	7.244E-03	.3941	.5006	1.067E-02	.5789	1.999E-02	
LS 1794(200)	3.33	7.244E-03	.3941	.5006	1.067E-02	.5789	1.999E-02	
US 7798(200)	3.35	7.215E-03	.3919	.4976	1.050E-02	.5751	1.989E-02	
T 7763(200)	4.41	5.770E-03	.3132	.3978	8.474E-03	.4600	1.589E-02	
A 3611(200)	4.41	5.770E-03	.3132	.3978	8.474E-03	.4600	1.589E-02	
LS 1795(200)	4.41	5.770E-03	.3132	.3978	8.474E-03	.4600	1.589E-02	
US 7799(200)	4.43	5.745E-03	.3117	.3959	8.434E-03	.4578	1.581E-02	
T 7764(200)	5.48	4.911E-03	.2674	.3344	7.242E-03	.3930	1.357E-02	
M 3612(200)	5.48	4.911E-03	.2674	.3344	7.242E-03	.3930	1.357E-02	
LS 1796(200)	5.48	4.911E-03	.2674	.3344	7.242E-03	.3930	1.357E-02	
US 7801(200)	5.51	4.916E-03	.2668	.3349	7.230E-03	.3919	1.354E-02	
T 7765(200)	6.56	4.316E-03	.2380	.3023	6.424E-03	.3496	1.210E-02	
A 3613(200)	6.56	4.316E-03	.2380	.3023	6.424E-03	.3496	1.210E-02	
LS 1797(200)	6.56	4.316E-03	.2380	.3023	6.424E-03	.3496	1.210E-02	
US 7802(200)	6.58	4.346E-03	.2369	.3004	6.412E-03	.3479	1.201E-02	
T 7766(200)	7.63	3.975E-03	.2157	.2739	5.834E-03	.3147	1.094E-02	
M 3614(200)	7.63	3.975E-03	.2157	.2739	5.834E-03	.3147	1.094E-02	
LS 1799(200)	7.63	3.975E-03	.2157	.2739	5.834E-03	.3147	1.094E-02	

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6/29/73

NASA-Q1 ORBITER HEATING

VAZHQ

AEDC(ARO,INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL R

GROUP CONFIG MODEL MACH NO PO(PST) TO(DEG R) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREBEND ROLL-MODEL YAW  
 4 1 1 7.96 123.2 1206 -.04 .04 0 180.00 -.00

T-INF P-INF Q-INF V-INF W-INF RMO-INF MC-INF RE/FT MREF STREF  
 (DEG R) (PSIA) (FT/SEC) (SLUGS/FT<sup>3</sup>) (LR-SEC/FT<sup>2</sup>) (FT-1) (R=.0175FT) (R=.0175FT)  
 8P.2 .013 .578 3663 1.240E-05 7.100E-08 6.397E 05 1.843E-02 5.136E-02

CAMERA ROLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHOXCK) TRAR(ITO) BETA(ITO)  
 TOP(IT) 8223 78 .0519 1.827E-01 1.8983E-01  
 UPPER SIDE(US) 7766  
 LOWER SIDE(LS) 7508  
 MOTTCH(R) 8234

PIC NO	TIME DELTIME	M(TO)	M(TO)/MREF	M(-9TO)	M(-9TO)/MREF	M(.85TO)	M(.85TO)/MREF	ST(ITO)
US 7P02(200)	7.66	3.967E-03	.2153	5.039E-03	.2735	5.825E-03	.3162	1.092E-02
M 7A15(200)	8.71	3.666E-03	.1990	4.657E-03	.2528	5.385E-03	.2923	1.010E-02
T 7P07(200)	8.74	3.660E-03	.1986	4.649E-03	.2522	5.376E-03	.2917	1.007E-02
US 7P03(200)	8.74	3.660E-03	.1986	4.649E-03	.2522	5.376E-03	.2917	1.007E-02
LS 7P04(200)	8.74	3.660E-03	.1986	4.649E-03	.2522	5.376E-03	.2917	1.007E-02
T 7P04(200)	8.74	3.660E-03	.1986	4.649E-03	.2522	5.376E-03	.2917	1.007E-02
M 7A16(200)	9.79	3.420E-03	.1857	4.344E-03	.2358	5.024E-03	.2727	9.420E-03
US 7P04(200)	9.81	3.415E-03	.1854	4.338E-03	.2355	5.016E-03	.2723	9.406E-03
LS 7P05(200)	9.81	3.415E-03	.1854	4.338E-03	.2355	5.016E-03	.2723	9.406E-03
T 7P05(200)	10.86	3.218E-03	.1745	4.087E-03	.2217	4.726E-03	.2563	8.849E-03
M 7A17(200)	10.86	3.218E-03	.1745	4.087E-03	.2217	4.726E-03	.2563	8.849E-03
US 7P06(200)	10.89	3.214E-03	.1745	4.082E-03	.2216	4.720E-03	.2562	8.850E-03
LS 7P07(200)	10.89	3.214E-03	.1745	4.082E-03	.2216	4.720E-03	.2562	8.850E-03
T 7P07(200)	11.94	3.048E-03	.1654	3.871E-03	.2100	4.476E-03	.2429	8.387E-03
M 7A18(200)	11.94	3.048E-03	.1652	3.864E-03	.2098	4.471E-03	.2426	8.377E-03
US 7P08(200)	11.96	3.044E-03	.1652	3.864E-03	.2098	4.471E-03	.2426	8.377E-03
LS 7P09(200)	11.96	3.044E-03	.1652	3.864E-03	.2098	4.471E-03	.2426	8.377E-03
T 7P09(200)	13.04	2.849E-03	.1573	3.652E-03	.1998	4.254E-03	.2310	7.977E-03
M 7A19(200)	13.04	2.849E-03	.1573	3.652E-03	.1998	4.254E-03	.2310	7.977E-03
US 7P10(200)	13.07	2.846E-03	.1571	3.648E-03	.1995	4.253E-03	.2307	7.962E-03
LS 7P11(200)	14.12	2.773E-03	.1504	3.571E-03	.1910	4.072E-03	.2209	7.624E-03
T 7P11(200)	14.12	2.773E-03	.1504	3.571E-03	.1910	4.072E-03	.2209	7.624E-03
M 7A20(200)	14.12	2.773E-03	.1504	3.571E-03	.1910	4.072E-03	.2209	7.624E-03
US 7P12(200)	14.12	2.773E-03	.1503	3.571E-03	.1909	4.068E-03	.2207	7.622E-03
LS 7P13(200)	14.16	2.770E-03	.1503	3.571E-03	.1909	4.068E-03	.2207	7.622E-03
T 7P13(200)	14.16	2.770E-03	.1503	3.571E-03	.1909	4.068E-03	.2207	7.622E-03

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6/29/73

AEDC(ARO,INC.) ARNOLD AFS, TENNESSEE  
VON KARMAN GAS DYNAMICS FACILITY  
50 INCH HYPERSONIC TUNNEL R

NASA-R1 ORBITER HEATING

VA249

GROUP	CONFIG	MODEL	MACH NO	PO(PSTIA)	TO(DEG R)	ALPHA-MODEL	ALPHA-SECTOR	ALPHA-PREBEMO	ROLL-MODEL	YAW
6	1	MATEO	7.96	123.2	1205	-0.04	.04	0	180.00	-0.00
T-INF	P-INF	Q-INF	V-INF	RMO-INF	MU-INF	RF/FT	MREF	STREF		
IDEG R	(PSTIA)	(PSIA)	(FT/SEC)	(SLUGS/FT <sup>3</sup> )	(LR-SEC/FT <sup>2</sup> )	(FT-1)	(R=.0175FT)	(R=.0175FT)		
88.2	.013	.578	3662	1.740E-05	7.099E-08	6.109E-05	1.443E-02	5.135E-02		
CAMERA	ROLL NO	PAINT IFMP	IDEG F	INITIAL TEMP	(DEG F)	SQUARE ROOT	(RHO/CXK)	TBAR(ITO)	BETA(ITO)	
TOP(IT)	8223									
UPPER	INLET(S)	7766	200	78	.0519			1.027E-01	1.8983E-01	
LOWER	STOE(LS)	7508								
MOTOM(8)	9234									

PIC NO	TIME DELTIME	M(ITO)	M(ITO)/MREF	M(.910)/MREF	M(.8510)/MREF	ST(ITO)
T 7773(200)	15.19	2.661E-03	.1444	.1474	.2121	7.324E-03
M 7421(200)	15.19	2.661E-03	.1444	.1474	.2121	7.324E-03
US 7404(200)	15.22	2.659E-03	.1442	.1472	.2118	7.312E-03
LS 1405(200)	15.22	2.659E-03	.1442	.1472	.2118	7.312E-03
M 3422(200)	16.27	2.563E-03	.1349	.1375	.2041	7.041E-03
T 7774(200)	16.29	2.561E-03	.1349	.1375	.2041	7.041E-03
US 7404(200)	16.29	2.561E-03	.1349	.1375	.2041	7.041E-03
LS 1405(200)	16.29	2.561E-03	.1349	.1375	.2041	7.041E-03
M 7421(200)	17.37	2.472E-03	.1342	.1374	.1971	6.809E-03
T 7775(200)	17.37	2.472E-03	.1342	.1374	.1971	6.809E-03
US 7404(200)	17.40	2.470E-03	.1340	.1372	.1969	6.793E-03
LS 1405(200)	17.45	2.470E-03	.1340	.1372	.1969	6.793E-03
M 7421(200)	18.45	2.343E-03	.1294	.1348	.1826	6.579E-03
US 7404(200)	18.45	2.343E-03	.1294	.1348	.1826	6.579E-03
LS 1405(200)	18.47	2.341E-03	.1292	.1347	.1824	6.574E-03
T 7776(200)	19.52	2.325E-03	.1254	.1328	.1848	6.379E-03
M 7421(200)	19.52	2.325E-03	.1254	.1328	.1848	6.379E-03
US 7404(200)	19.55	2.314E-03	.1254	.1328	.1848	6.379E-03
LS 1405(200)	19.55	2.314E-03	.1254	.1328	.1848	6.379E-03
M 7421(200)	20.56	2.234E-03	.1222	.1302	.1795	6.192E-03
US 7404(200)	20.56	2.234E-03	.1222	.1302	.1795	6.192E-03
LS 1405(200)	20.56	2.234E-03	.1222	.1302	.1795	6.192E-03
T 7777(200)	21.67	2.143E-03	.1199	.1281	.1747	6.030E-03
M 7421(200)	21.67	2.143E-03	.1199	.1281	.1747	6.030E-03
US 7404(200)	21.67	2.143E-03	.1199	.1281	.1747	6.030E-03
LS 1405(200)	21.67	2.143E-03	.1199	.1281	.1747	6.030E-03

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64299

AEOCIARO, INC.) ARNOLD AFS, TENNESSEE  
VON KARMAN GAS DYNAMICS FACILITY  
50 INC- HYPERSONIC TUNNEL 9

6129173

GROUP	CONFIG	MODEL	MACH NO	DOIPSTA1	T0(OEG R)	ALPHA-MODEL	ALPHA-SECTOR	ALPHA-PREBEND	ROLL-MODEL	YAW
4	1	MAT0N	7.96	123.3	1206	-.04	.04	0	120.00	-.00

T-Inf	O-Inf	V-Inf	RMO-Inf	MU-Inf	RE/FY	HREF	SREF
(PSIA)	(PSIA)	(FT/SFC)	(SLUGS/FT <sup>3</sup> )	(LB-SEC/FT <sup>2</sup> )	(FT-L)	(M-.0175F)	(M-.0175F)
IDEAL R		3662	1.241E+05	7.039E+08	6.40E 05	1.944E-02	5.134E-02
RM-2	.013	.57P					

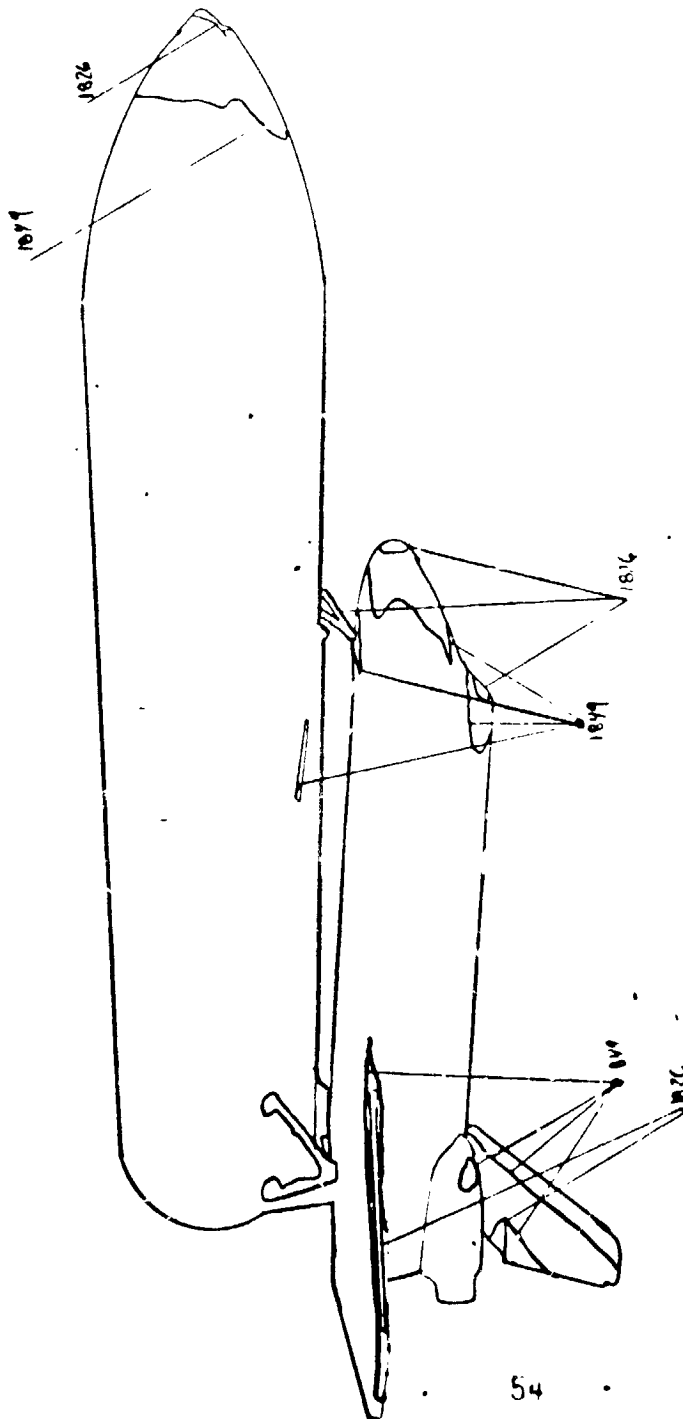
C-MERA	ROLL NO	PAINT TEMP (DEG F)	INITIAL TEMP (DEG F)	SQUARE ROOT (INCHES)	TRANSIT TO	BETA (TO)
TOP IT)	8223					
IMPERF SINE (US)	7766	200	78	.0519	1.827E-31	1.8983E-01
LOW-F SINE (LS)	7909					
MOTOM (B)	8234					

PIC NO	TIME	DELTIME	MITOI	M(TOI)/MREF	M(.5TO)	M(.9TO)/MREF	M(.85TO)	M(.85TO)/MREF	ST(10)
T	7706(200)	36.71	1.709E-03	.0927	2.171E-03	.1177	2.510E-03	.1361	4.696E-03
M	7436(200)	36.71	1.709E-03	.0927	2.171E-03	.1177	2.510E-03	.1361	4.696E-03
LS	7014(200)	36.71	1.709E-03	.0927	2.171E-03	.1177	2.510E-03	.1361	4.696E-03
US	7221(200)	36.74	1.709E-03	.0926	2.170E-03	.1176	2.509E-03	.1360	4.694E-03
T	7221(200)	36.79	1.658E-03	.0899	2.104E-03	.1147	2.435E-03	.1320	4.556E-03
M	7435(200)	36.79	1.659E-03	.0899	2.106E-03	.1142	2.435E-03	.1320	4.555E-03
LS	7013(200)	36.82	1.658E-03	.0899	2.105E-03	.1142	2.435E-03	.1320	4.554E-03
US	7419(200)	36.82	1.670E-03	.0899	2.107E-03	.1142	2.435E-03	.1320	4.554E-03
T	7436(200)	36.87	1.611E-03	.0873	2.067E-03	.1119	2.367E-03	.1283	4.424E-03
LS	7012(200)	36.89	1.611E-03	.0874	2.066E-03	.1110	2.368E-03	.1283	4.424E-03
US	7436(200)	36.89	1.611E-03	.0874	2.066E-03	.1110	2.368E-03	.1283	4.424E-03
T	7746(200)	36.57	1.610E-03	.0873	2.065E-03	.1109	2.367E-03	.1282	4.424E-03
LS	7436(200)	36.57	1.610E-03	.0873	2.065E-03	.1109	2.367E-03	.1282	4.424E-03
US	7436(200)	36.57	1.610E-03	.0873	2.065E-03	.1109	2.367E-03	.1282	4.424E-03
T	7436(200)	36.57	1.584E-03	.0850	1.991E-03	.1079	2.307E-03	.1249	4.395E-03
LS	7436(200)	36.57	1.584E-03	.0850	1.991E-03	.1079	2.307E-03	.1249	4.395E-03
US	7436(200)	36.57	1.584E-03	.0850	1.991E-03	.1079	2.307E-03	.1249	4.395E-03
T	7221(200)	41.00	1.577E-03	.0850	1.991E-03	.1079	2.307E-03	.1249	4.395E-03
LS	7221(200)	41.00	1.577E-03	.0850	1.991E-03	.1079	2.307E-03	.1249	4.395E-03
US	7221(200)	41.00	1.577E-03	.0850	1.991E-03	.1079	2.307E-03	.1249	4.395E-03

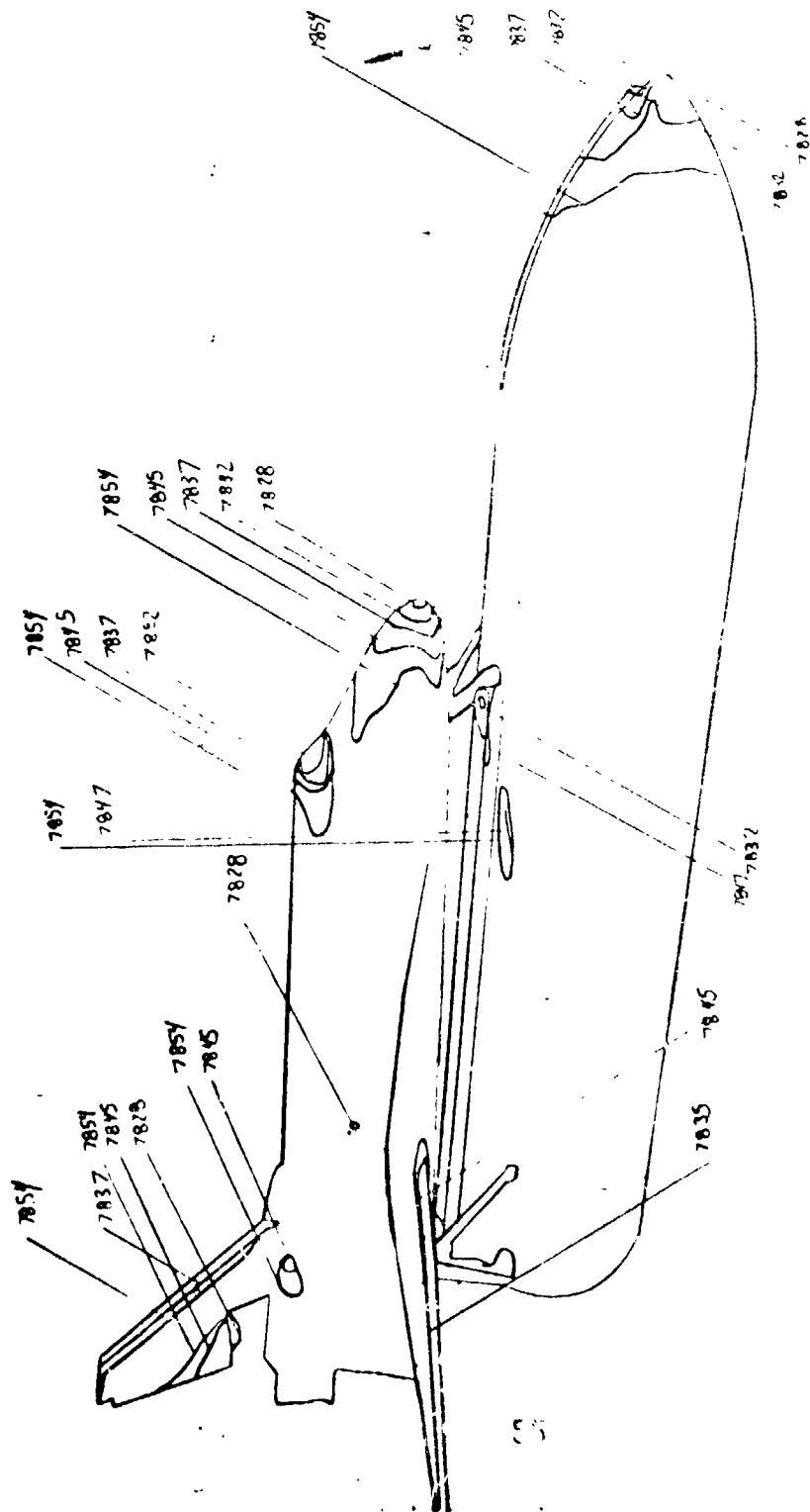
MODEL WAS LEFT CENTLINE

MODEL WAS LEFT CENTRELINE

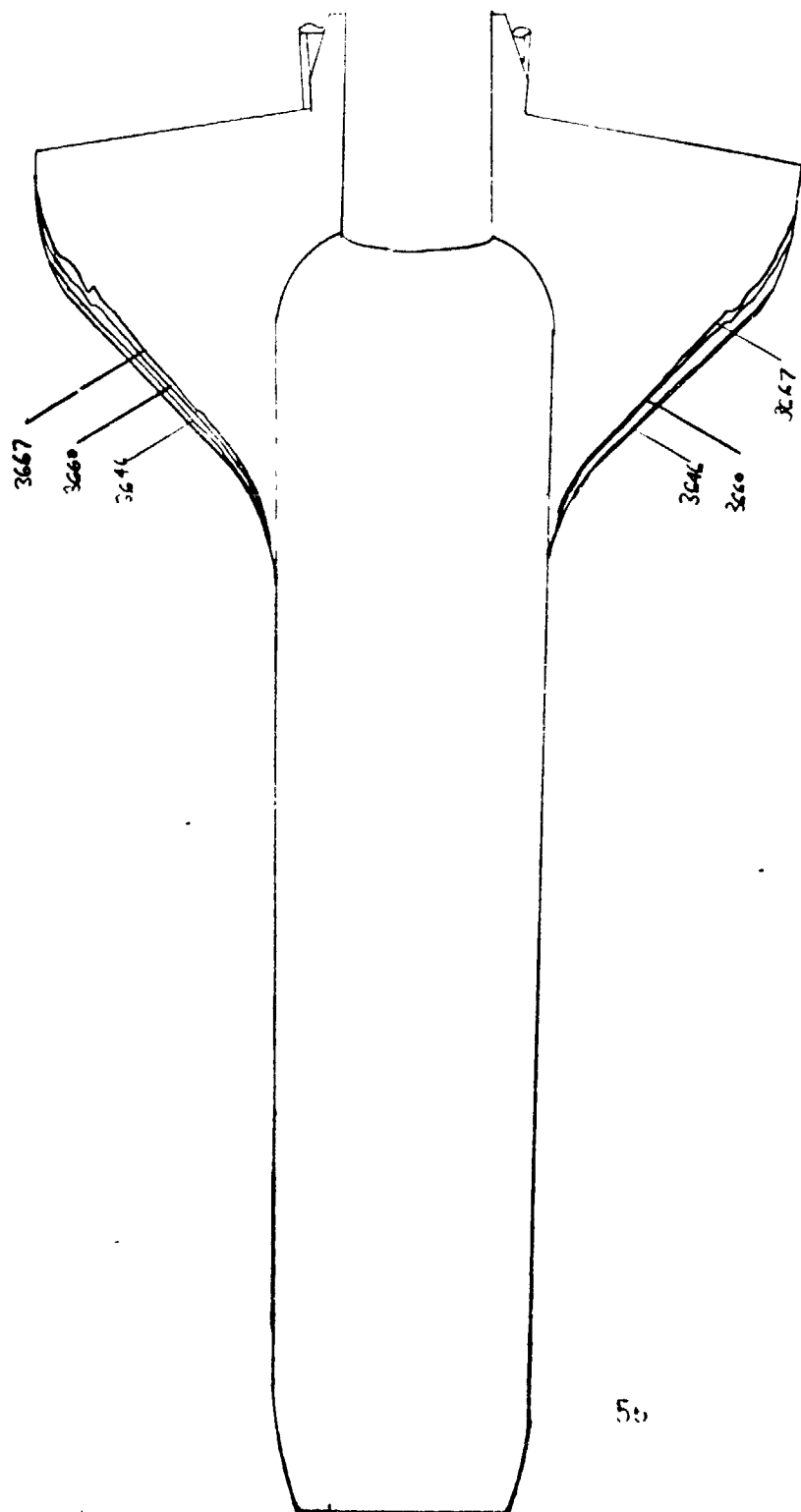
Comp 7  
7908  
Lower Side  
100



7766  
EP 7  
Upper Side



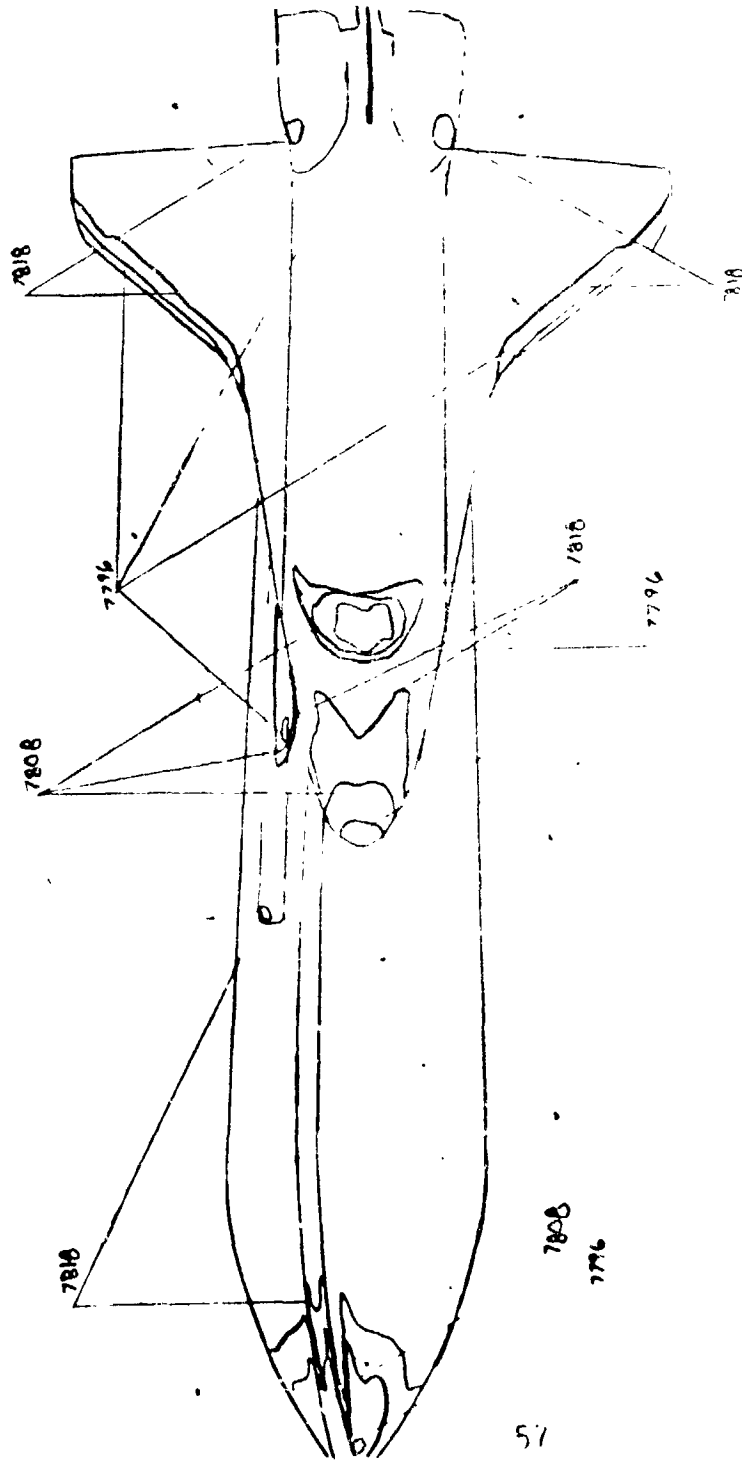
8234  
687  
Bottom



OWC

5b

Group 7  
8223  
Top  
W



cm



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6/29/73

AEDC(ARINC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL B

NASA-RI ORBITER HEATING  
 VA289

GROUP	CONFID	MODEL	MACH NO	PO(PSTIA)	TO(DEC R)	ALPHA-MODEL	ALPHA-SECTOR	ALPHA-PREBEND	ROLL-MODEL	YAW
7	1	MATED	7.96	123.1	1206	.04	.04	0	0	0
T-INF	P-INF	Q-INF	V-INF	RHO-INF	MU-INF	RE/FT	HF/CF	STREF		
(DEC R)	(PSTIA)	(FT/SFC)	(SLUGS/FT <sup>3</sup> )	(LB-SEC/FT <sup>2</sup> )	(FT-1)	(R= .0175FT)	(R= .0175FT)			
88.2	.013	.578	3663	1.239E-05	7.102E-08	6.389E 05	1.842E-02	5.139E-02		
CAVEIRA	ROLL NO	PAINT TEMP (DEC F)	INITIAL TEMP (DEC F)	SQUARE ROOT (RHOXCK)	TRAR(TO)	BETA(TO)				
TOP(IT)	8223									
UPPER SIDE(US)	7766									
LOWER SIDE(LS)	7908									
BOTTOM(B)	8234									

PIC NO	TIME DELTIME	H(TO)	H(TO)/HREF	H(.9TO)	H(.9TO)/HREF	H(.85TO)	H(.85TO)/HREF	ST(TO)
US 7732(250)	7.68	6.246E-03	.3390	8.119E-03	.4407	9.559E-03	.5188	1.716E-02
T 7797(250)	8.74	5.774E-03	.3133	7.506E-03	.4072	8.837E-03	.4794	1.585E-02
R 3645(250)	8.74	5.774E-03	.3133	7.506E-03	.4072	8.837E-03	.4794	1.585E-02
LS 1829(250)	8.74	5.774E-03	.3133	7.506E-03	.4072	8.837E-03	.4794	1.585E-02
US 7833(250)	8.76	5.764E-03	.3129	7.493E-03	.4067	8.821E-03	.4788	1.584E-02
T 7798(250)	9.81	5.387E-03	.2923	7.003E-03	.3900	8.244E-03	.4473	1.479E-02
H 3646(250)	9.81	5.387E-03	.2923	7.003E-03	.3900	8.244E-03	.4473	1.479E-02
LS 1830(250)	9.81	5.387E-03	.2923	7.003E-03	.3900	8.244E-03	.4473	1.479E-02
US 7834(250)	9.84	5.379E-03	.2917	6.992E-03	.3892	8.232E-03	.4465	1.478E-02
T 7799(250)	10.89	5.069E-03	.2749	6.589E-03	.3573	7.757E-03	.4207	1.390E-02
H 3647(250)	10.89	5.069E-03	.2749	6.589E-03	.3573	7.757E-03	.4207	1.390E-02
LS 1831(250)	10.89	5.069E-03	.2749	6.589E-03	.3573	7.757E-03	.4207	1.390E-02
US 7835(250)	10.91	5.062E-03	.2747	6.580E-03	.3570	7.747E-03	.4203	1.390E-02
T 7800(250)	11.56	4.801E-03	.2604	6.241E-03	.3385	7.347E-03	.3985	1.317E-02
H 3648(250)	11.56	4.801E-03	.2604	6.241E-03	.3385	7.347E-03	.3985	1.317E-02
LS 1832(250)	11.59	4.794E-03	.2600	6.233E-03	.3370	7.337E-03	.3978	1.316E-02
US 7836(250)	11.59	4.794E-03	.2600	6.233E-03	.3370	7.337E-03	.3978	1.316E-02
T 7801(250)	13.07	4.567E-03	.2477	5.936E-03	.3219	6.984E-03	.3790	1.253E-02
US 7837(250)	13.07	4.567E-03	.2477	5.936E-03	.3219	6.984E-03	.3790	1.253E-02
H 3649(250)	13.07	4.567E-03	.2477	5.936E-03	.3219	6.984E-03	.3790	1.253E-02
LS 1833(250)	13.07	4.567E-03	.2477	5.936E-03	.3219	6.984E-03	.3790	1.253E-02
T 7802(250)	14.14	4.368E-03	.2369	5.678E-03	.3078	6.685E-03	.3624	1.197E-02
H 3650(250)	14.14	4.368E-03	.2369	5.678E-03	.3078	6.685E-03	.3624	1.197E-02
LS 1834(250)	14.14	4.368E-03	.2369	5.678E-03	.3078	6.685E-03	.3624	1.197E-02
US 7838(250)	14.17	4.364E-03	.2367	5.672E-03	.3076	6.678E-03	.3622	1.197E-02

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6/29/73

NASA-RT ORBITER HEATING

AEDC(ARO, INC.) ARNOLD AFS, TN ESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL R

VA289

GROUP CONFIG MODEL MACH NO PO(PSIA) TO(DEG R) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREBEND ROLL-MODEL YAW  
 7 1 7.96 123.3 1206 .04 .04 0 0 0  
 T-INF P-INF Q-INF V-INF MU-INF RE/FT HREF STREF  
 (DEG R) (PSIA) (PSIA) (FT/SEC) (SLUGS/FT<sup>3</sup>) (LH-SEC/FT<sup>2</sup>) (FT-1) (R=.0175FT) (R=.0175FT)  
 RP.2 .013 .578 3663 1.240E-05 7.102E-08 6.398E 05 1.844E-02 5.135E-02  
 CAMERA ROLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHOXCKK) TRAR(TO) RETA(TO)  
 TUP(T) 8223  
 UPPER SIDE(US) 7766  
 LOWER SIDE(LS) 790A  
 MOTHCH(M) 8234  
 .0535 2.586E-01 2.9025E-01

PIC NO TIME DELTIME H(TO) H(TO)/HREF H(.9TO) HREF H(.85TO) HREF H(.85TO) ST(TO)  
 T 7803(250) 15.22 13.71 4.193E-03 .2273 5.451E-03 .2955 6.417E-03 .3478 1.149E-02  
 M 7851( 50) 15.22 13.71 4.193E-03 .2273 5.451E-03 .2955 6.417E-03 .3478 1.149E-02  
 LS 1835(250) 15.22 13.71 4.193E-03 .2273 5.451E-03 .2955 6.417E-03 .3478 1.149E-02  
 US 7834(250) 15.24 13.74 4.189E-03 .2271 5.446E-03 .2952 6.411E-03 .3475 1.148E-02  
 T 7804(250) 16.29 14.79 4.038E-03 .2188 5.248E-03 .2844 6.179E-03 .3348 1.106E-02  
 M 7852(250) 16.29 14.79 4.038E-03 .2188 5.248E-03 .2844 6.179E-03 .3348 1.106E-02  
 LS 1836(250) 16.29 14.79 4.038E-03 .2188 5.248E-03 .2844 6.179E-03 .3348 1.106E-02  
 US 7840(250) 16.32 14.82 4.034E-03 .2186 5.244E-03 .2842 6.174E-03 .3345 1.105E-02  
 T 7805(250) 17.27 15.87 3.849E-03 .2112 5.063E-03 .2745 5.966E-03 .3231 1.067E-02  
 M 7853(250) 17.40 15.89 3.845E-03 .2111 5.063E-03 .2744 5.961E-03 .3230 1.067E-02  
 LS 1837(250) 17.40 15.89 3.845E-03 .2111 5.063E-03 .2744 5.961E-03 .3230 1.067E-02  
 US 7841(250) 17.40 15.89 3.845E-03 .2111 5.063E-03 .2744 5.961E-03 .3230 1.067E-02  
 T 7806(250) 18.47 16.97 3.770E-03 .2042 4.900E-03 .2654 5.769E-03 .3125 1.032E-02  
 M 7854(250) 18.47 16.97 3.770E-03 .2042 4.900E-03 .2654 5.769E-03 .3125 1.032E-02  
 LS 1838(250) 18.47 16.97 3.770E-03 .2042 4.900E-03 .2654 5.769E-03 .3125 1.032E-02  
 US 7842(250) 18.50 16.99 3.767E-03 .2040 4.897E-03 .2652 5.765E-03 .3123 1.031E-02  
 T 7807(250) 19.55 18.04 3.656E-03 .1980 4.752E-03 .2574 5.594E-03 .3030 1.000E-02  
 M 7855(250) 19.55 18.04 3.656E-03 .1980 4.752E-03 .2574 5.594E-03 .3030 1.000E-02  
 LS 1839(250) 19.56 18.07 3.654E-03 .1979 4.752E-03 .2571 5.594E-03 .3030 1.000E-02  
 US 7843(250) 19.57 18.07 3.653E-03 .1978 4.749E-03 .2571 5.590E-03 .3027 9.988E-03  
 T 7808(250) 20.62 19.12 3.551E-03 .1922 4.616E-03 .2498 5.435E-03 .2941 9.702E-03  
 M 7856(250) 20.62 19.12 3.551E-03 .1922 4.616E-03 .2498 5.435E-03 .2941 9.702E-03  
 LS 1840(250) 20.65 19.15 3.549E-03 .1922 4.613E-03 .2499 5.431E-03 .2942 9.710E-03  
 US 7844(250) 20.65 19.15 3.549E-03 .1922 4.613E-03 .2499 5.431E-03 .2942 9.710E-03  
 T 7809(250) 21.10 20.20 3.455E-03 .1870 4.491E-03 .2431 5.288E-03 .2862 9.439E-03

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AEDC(ARO, INC.) ARNOLD AFS, TENNESSEE  
VON KARMAN GAS DYNAMICS FACILITY  
50 INCH HYPERSONIC TUNNEL A

70-10610M(8) 8234  
70-10610M(15) 7508

PIC NO	TIME DELTIME
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3	000000
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100	000000

7A09(250) 21.72 20.22

7845(250)	21.72	29.22
1051(250)	21.72	29.22
1052(250)	21.72	29.22
1053(250)	21.72	29.22
1054(250)	21.72	29.22
1055(250)	21.72	29.22
1056(250)	21.72	29.22
1057(250)	21.72	29.22
1058(250)	21.72	29.22
1059(250)	21.72	29.22
1060(250)	21.72	29.22
1061(250)	21.72	29.22
1062(250)	21.72	29.22
1063(250)	21.72	29.22
1064(250)	21.72	29.22
1065(250)	21.72	29.22
1066(250)	21.72	29.22
1067(250)	21.72	29.22
1068(250)	21.72	29.22
1069(250)	21.72	29.22
1070(250)	21.72	29.22
1071(250)	21.72	29.22
1072(250)	21.72	29.22
1073(250)	21.72	29.22
1074(250)	21.72	29.22
1075(250)	21.72	29.22
1076(250)	21.72	29.22
1077(250)	21.72	29.22
1078(250)	21.72	29.22
1079(250)	21.72	29.22
1080(250)	21.72	29.22
1081(250)	21.72	29.22
1082(250)	21.72	29.22
1083(250)	21.72	29.22
1084(250)	21.72	29.22
1085(250)	21.72	29.22
1086(250)	21.72	29.22
1087(250)	21.72	29.22
1088(250)	21.72	29.22
1089(250)	21.72	29.22
1090(250)	21.72	29.22
1091(250)	21.72	29.22
1092(250)	21.72	29.22
1093(250)	21.72	29.22
1094(250)	21.72	29.22
1095(250)	21.72	29.22
1096(250)	21.72	29.22
1097(250)	21.72	29.22
1098(250)	21.72	29.22
1099(250)	21.72	29.22
1100(250)	21.72	29.22
1101(250)	21.72	29.22
1102(250)	21.72	29.22
1103(250)	21.72	29.22
1104(250)	21.72	29.22
1105(250)	21.72	29.22
1106(250)	21.72	29.22
1107(250)	21.72	29.22
1108(250)	21.72	29.22
1109(250)	21.72	29.22
1110(250)	21.72	29.22
1111(250)	21.72	29.22
1112(250)	21.72	29.22
1113(250)	21.72	29.22
1114(250)	21.72	29.22
1115(250)	21.72	29.22
1116(250)	21.72	29.22
1117(250)	21.72	29.22
1118(250)	21.72	29.22
1119(250)	21.72	29.22
1120(250)	21.72	29.22
1121(250)	21.72	29.22
1122(250)	21.72	29.22
1123(250)	21.72	29.22
1124(250)	21.72	29.22
1125(250)	21.72	29.22
1126(250)	21.72	29.22
1127(250)	21.72	29.22
1128(250)	21.72	29.22
1129(250)	21.72	29.22
1130(250)	21.72	29.22
1131(250)	21.72	29.22
1132(250)	21.72	29.22
1133(250)	21.72	29.22
1134(250)	21.72	29.22
1135(250)	21.72	29.22
1136(250)	21.72	29.22
1137(250)	21.72	29.22
1138(250)	21.72	29.22
1139(250)	21.72	29.22
1140(250)	21.72	29.22
1141(250)	21.72	29.22
1142(250)	21.72	29.22
1143(250)	21.72	29.22
1144(250)	21.72	29.22

1	105210194	23-22	21.72	22.02
1	105210194	23-22	21.72	22.02
1	105210194	23-22	21.72	22.02

Year	1950	1951	1952	1953
1950	105.0	105.0	105.0	105.0
1951	105.0	105.0	105.0	105.0
1952	105.0	105.0	105.0	105.0
1953	105.0	105.0	105.0	105.0

LS 1042(250) 22.80 21.30

US 7046125 22.83 21.32

721112571	23.88	22.37
765412501	23.49	22.37

Year	1939	1940	1941	1942	1943	1944	1945	1946	1947	1948	1949	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059	2060	2061	2062	2063	2064	2065	2066	2067	2068	2069	2070	2071	2072	2073	2074	2075	2076	2077	2078	2079	2080	2081	2082	2083	2084	2085	2086	2087	2088	2089	2090	2091	2092	2093	2094	2095	2096	2097	2098	2099	2100
1939	1939	1940	1941	1942	1943	1944	1945	1946	1947	1948	1949	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059	2060	2061	2062	2063	2064	2065	2066	2067	2068	2069	2070	2071	2072	2073	2074	2075	2076	2077	2078	2079	2080	2081	2082	2083	2084	2085	2086	2087	2088	2089	2090	2091	2092	2093	2094	2095	2096	2097	2098	2099	2100

115 7447(250) 23.90 22.47

7512(259) 24.95 23.45

34	3460 (250)	24.55	23.43
35	3461 (250)	24.55	23.43

US 7842155 24.58  
US 7842156 24.58

7013(250) 26.03 24.53

Year	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059	2060	2061	2062	2063	2064	2065	2066	2067	2068	2069	2070	2071	2072	2073	2074	2075	2076	2077	2078	2079	2080	2081	2082	2083	2084	2085	2086	2087	2088	2089	2090	2091	2092	2093	2094	2095	2096	2097	2098	2099	2100
Population	150,000,000	155,000,000	160,000,000	165,000,000	170,000,000	175,000,000	180,000,000	185,000,000	190,000,000	195,000,000	200,000,000	205,000,000	210,000,000	215,000,000	220,000,000	225,000,000	230,000,000	235,000,000	240,000,000	245,000,000	250,000,000	255,000,000	260,000,000	265,000,000	270,000,000	275,000,000	280,000,000	285,000,000	290,000,000	295,000,000	300,000,000	305,000,000	310,000,000	315,000,000	320,000,000	325,000,000	330,000,000	335,000,000	340,000,000	345,000,000	350,000,000	355,000,000	360,000,000	365,000,000	370,000,000	375,000,000	380,000,000	385,000,000	390,000,000	395,000,000	400,000,000	405,000,000	410,000,000	415,000,000	420,000,000	425,000,000	430,000,000	435,000,000	440,000,000	445,000,000	450,000,000	455,000,000	460,000,000	465,000,000	470,000,000	475,000,000	480,000,000	485,000,000	490,000,000	495,000,000	500,000,000	505,000,000	510,000,000	515,000,000	520,000,000	525,000,000	530,000,000	535,000,000	540,000,000	545,000,000	550,000,000	555,000,000	560,000,000	565,000,000	570,000,000	575,000,000	580,000,000	585,000,000	590,000,000	595,000,000	600,000,000	605,000,000	610,000,000	615,000,000	620,000,000	625,000,000	630,000,000	635,000,000	640,000,000	645,000,000	650,000,000	655,000,000	660,000,000	665,000,000	670,000,000	675,000,000	680,000,000	685,000,000	690,000,000	695,000,000	700,000,000	705,000,000	710,000,000	715,000,000	720,000,000	725,000,000	730,000,000	735,000,000	740,000,000	745,000,000	750,000,000	755,000,000	760,000,000	765,000,000	770,000,000	775,000,000	780,000,000	785,000,000	790,000,000	795,000,000	800,000,000	805,000,000	810,000,000	815,000,000	820,000,000	825,000,000	830,000,000	835,000,000	840,000,000	845,000,000	850,000,000	855,000,000	860,000,000	865,000,000	870,000,000	875,000,000	880,000,000	885,000,000	890,000,000	895,000,000	

LS	1845(257)	26.03	24.55
1845	1845(257)	26.03	24.55

1	781412501	27.76	26.25
1	18441351	26.55	24.45

1650	21.76	26.25
1651	21.76	26.25
1652	21.76	26.25
1653	21.76	26.25
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1656	21.76	26.25
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1729	21.76	26.25
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1749	21.76	26.25
1750	21.76	26.25
1751	21.76	26.25
1752	21.76	26.25
1753	21.76	26.25
1754	21.76	26.25

U.S. 1844 (250); 27.76 26.75

	78511259	27.78	26.29
SIN	15511507		

44-382	67-62	105-1397c	H
44-382	67-62	105-1397c	H

Page 2 of 2

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130	131	132	133	134	135	136	137	138	139	140	141	142	143	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159	160	161	162	163	164	165	166	167	168	169	170	171	172	173	174	175	176	177	178	179	180	181	182	183	184	185	186	187	188	189	190	191	192	193	194	195	196	197	198	199	200	201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230	231	232	233	234	235	236	237	238	239	240	241	242	243	244	245	246	247	248	249	250	251	252	253	254	255	256	257	258	259	260	261	262	263	264	265	266	267	268	269	270	271	272	273	274	275	276	277	278	279	280	281	282	283	284	285	286	287	288	289	290	291	292	293	294	295	296	297	298	299	300	301	302	303	304	305	306	307	308	309	310	311	312	313	314	315	316	317	318	319	320	321	322	323	324	325	326	327	328	329	330	331	332	333	334	335	336	337	338	339	340	341	342	343	344	345	346	347	348	349	350	351	352	353	354	355	356	357	358	359	360	361	362	363	364	365	366	367	368	369	370	371	372	373	374	375	376	377	378	379	380	381	382	383	384	385	386	387	388	389	390	391	392	393	394	395	396	397	398	399	400	401	402	403	404	405	406	407	408	409	410	411	412	413	414	415	416	417	418	419	420	421	422	423	424	425	426	427	428	429	430	431	432	433	434	435	436	437	438	439	440	441	442	443	444	445	446	447	448	449	450	451	452	453	454	455	456	457	458	459	460	461	462	463	464	465	466	467	468	469	470	471	472	473	474	475	476	477	478	479	480	481	482	483	484	485	486	487	488	489	490	491	492	493	494	495	496	497	498	499	500	501	502	503	504	505	506	507	508	509	510	511	512	513	514	515	516	517	518	519	520	521	522	523	52
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\*\*\*\*\* UNCLASSIFIED \*\*\*\*\*

AECD(ARO,INC.) ARNOLD AFS, TENNESSEE  
VON KARMAN GAS DYNAMICS FACILITY  
50 INCH HYPERSONIC TUNNEL A

b6  
b7C  
b7D

MODEL	MACH NO	PO(P(SIA)	TOTDEG P)	ALPHA-MODEL	ALPHA-SECTOR	ALPHA-PREBEND	ROLL-MODEL	YAW
MATED	7.96	124.0	1206	.04	.04	0	0	0

CAMERA	ROLL NO	PAINT TEMP (DEG F)	INITIAL TEMP (DEG F)	SQUARE ROOT (RHOXCXK)	TBAR(TO)	BETA(TO)
1	1	1	1	1	1	1

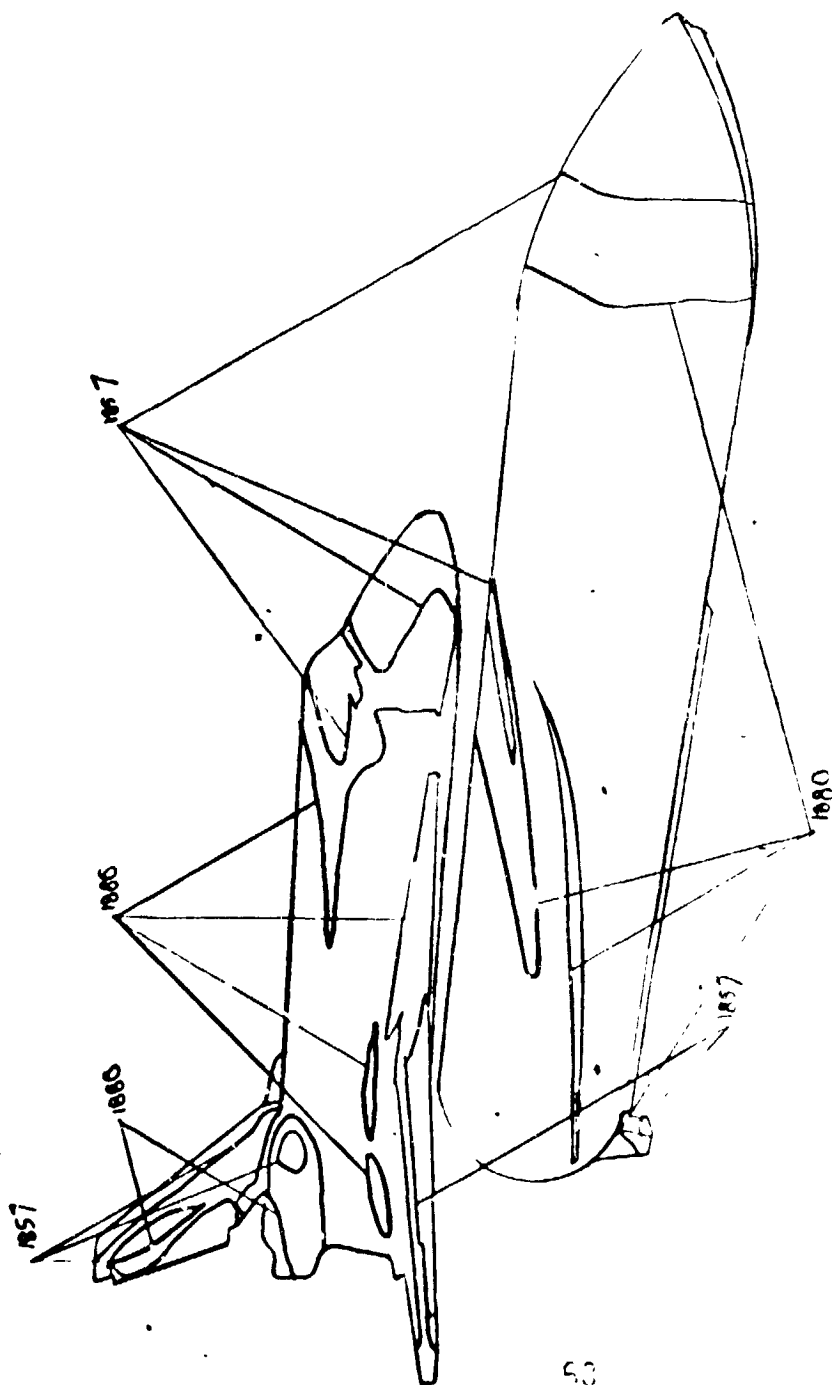
TOP(Y)	8223		
UPPER SINE(US)	7166	270	0.0535
		277	2.586E-01
			2.9025E-01

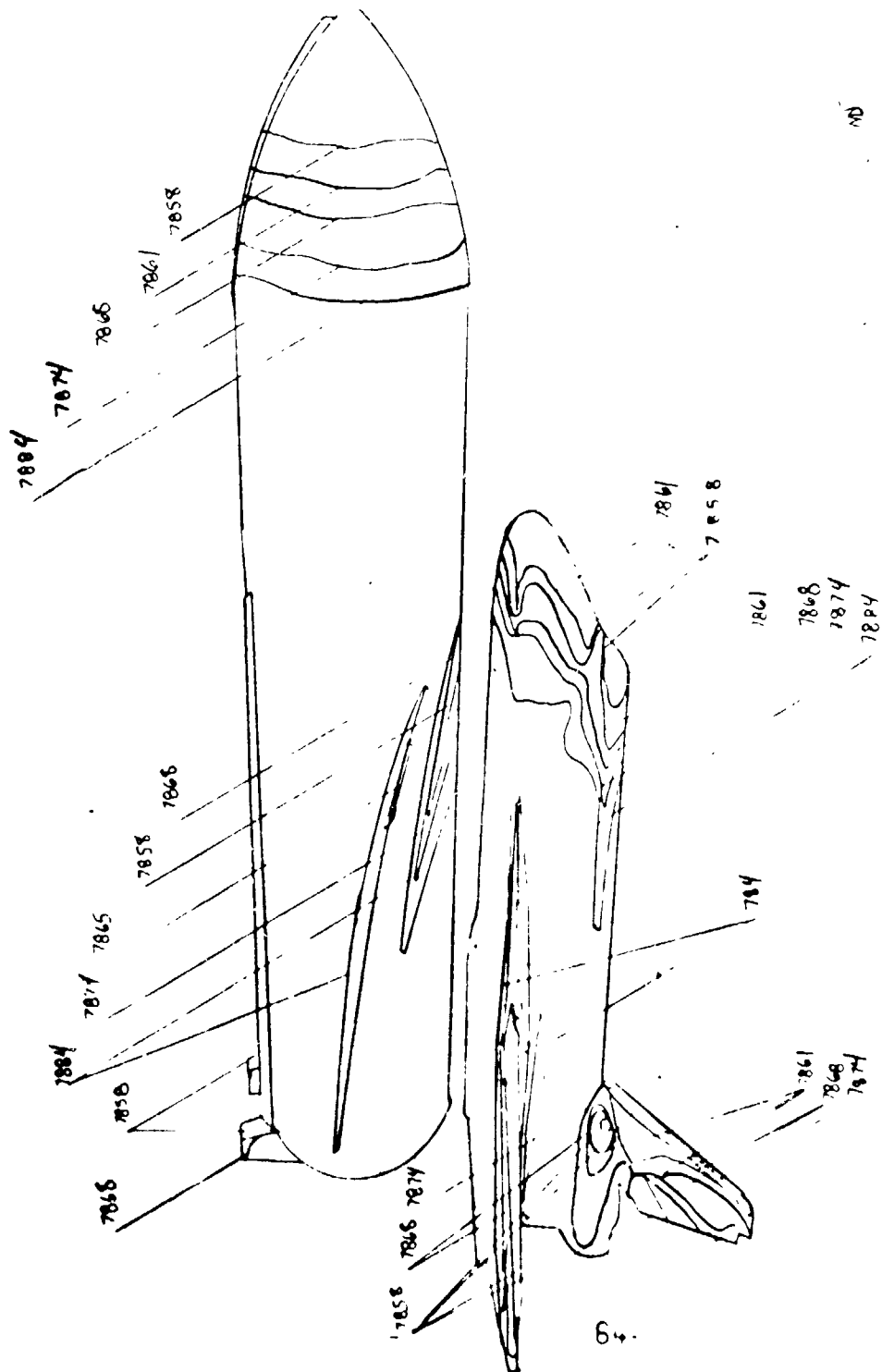
PIC NO	TIME	DEL TIME	H(TO)	M(TO)/MREF	M(.85TO)	M(.9TO)/MREF	M(.85TO)	M(.9TO)	ST(70)
US 7551(250)	29.86	28.34	2.916E-03	.1576	3.791E-03	.2049	4.463E-03	7.948E-03	
LS 1947(250)	29.86	28.36	2.916E-03	.1576	3.791E-03	.2049	4.463E-03	7.948E-03	
T 7416(250)	31.54	30.43	2.815E-03	.1522	3.659E-03	.1979	4.308E-03	7.677E-03	
R 3464(-250)	31.54	30.43	2.815E-03	.1522	3.659E-03	.1979	4.308E-03	7.677E-03	
LS 1942(250)	31.54	30.43	2.815E-03	.1522	3.659E-03	.1979	4.308E-03	7.677E-03	
US 7452(250)	31.56	30.46	2.814E-03	.1520	3.657E-03	.1976	4.306E-03	7.662E-03	
T 7417(250)	32.84	32.34	2.731E-03	.1476	3.550E-03	.1919	4.179E-03	7.429E-03	
R 3445(250)	32.84	32.34	2.731E-03	.1476	3.550E-03	.1919	4.179E-03	7.429E-03	
US 7953(250)	33.86	32.36	2.730E-03	.1475	3.548E-03	.1918	4.177E-03	7.431E-03	
LS 1943(250)	33.86	32.36	2.730E-03	.1475	3.548E-03	.1918	4.177E-03	7.431E-03	
T 7417(250)	35.52	34.41	2.647E-03	.1430	3.441E-03	.1859	4.051E-03	7.209E-03	
R 3446(250)	35.52	34.41	2.647E-03	.1430	3.441E-03	.1859	4.051E-03	7.209E-03	
LS 1950(250)	35.52	34.41	2.647E-03	.1430	3.441E-03	.1859	4.051E-03	7.209E-03	
US 7454(250)	35.56	34.44	2.646E-03	.1430	3.441E-03	.1859	4.049E-03	7.209E-03	
T 7419(250)	37.59	36.49	2.511E-03	.1388	3.341E-03	.1804	3.934E-03	6.990E-03	
R 3447(250)	37.59	36.49	2.511E-03	.1388	3.341E-03	.1804	3.934E-03	6.990E-03	
MODEL HAS LEFT CENTERLINE	38.02								
US 7456(250)	38.02	36.52	2.510E-03	.1384	3.340E-03	.1804	3.933E-03	6.992E-03	
LS 1951(250)	38.02	36.52	2.510E-03	.1388	3.340E-03	.1804	3.933E-03	6.992E-03	

157

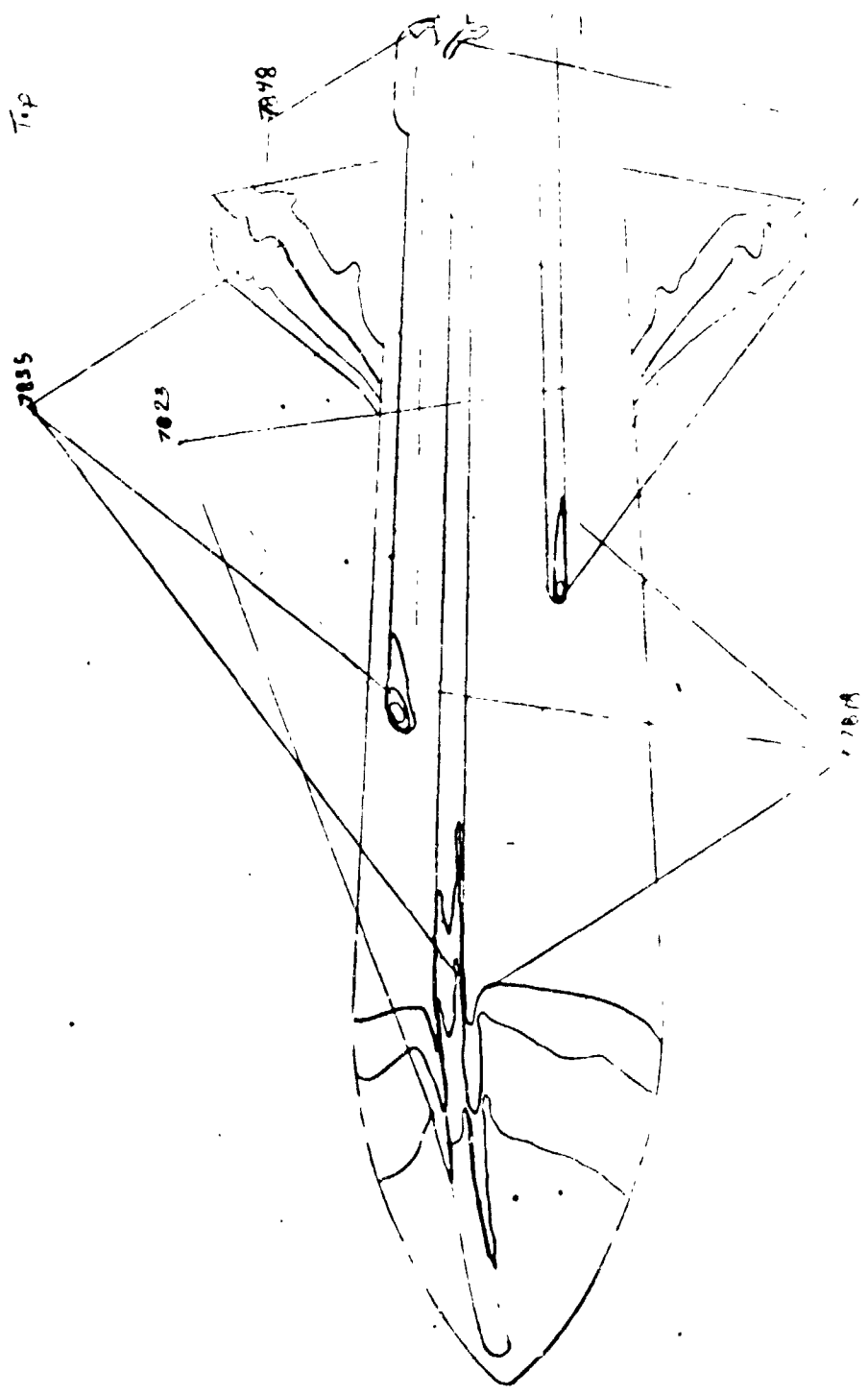
62

Group 8  
79081  
Lower Side  
100

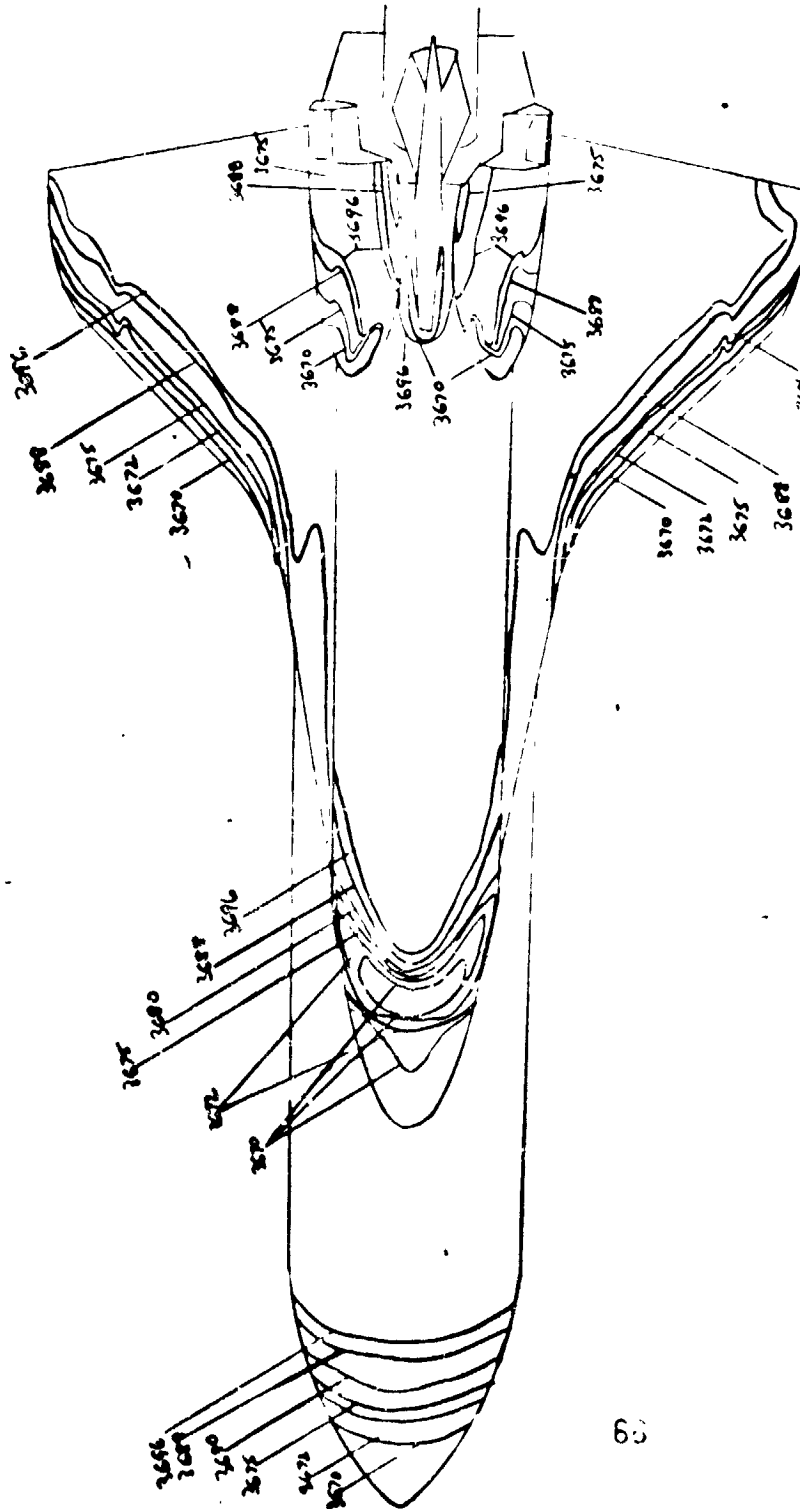




Group 8  
8723  
N  
Top



82344  
GP 8  
Bottom



CWL

\*\*\*\*\*  
 UNCLASSIFIED  
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6/29/73

# NASA-R1 ORBITER HEATING

AEDC(ARL, INC.) ARNOLD AFB, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL R

VAZAS

GROUP	CONFID	MODEL	MACH NO	PO(PSTIA)	TOLDED R	ALPHA-MODEL	ALPHA-SECTOR	ALPHA-PREBEND	ROLL-MODEL	YAL
A	1		7.96	122.8	1204	-0.05	0.05	0	180.00	-0.00
T-JAF	0-1NF	0-1NF								
(DEG R)	(PSTIA)	(PSTIA)								
28.1	0.12	0.576	3601	1.237E-05	7.041E-08	6.387E-05	1.440E-02	5.141E-02		
CAMERA		ROLL NO	PAINT TEMP (DEG F)	INITIAL TEMP (DEG F)	SQUARE ROOT (RHOCACR)	TRAR(TO)	BETA(TO)			
1.6111	8223									
UPPER SIDEWALL	7265									
LOWER SIDEWALL	7509									
BOTTOMWALL	8236									

PIC NO	TIME RELTIME	ALTO	M(TO)/MREF	M(9TO)	M(0.5TO)/MREF	M(0.85TO)/MREF	ST(TO)
T 7820(113)	1.15	MODEL HAS NOT REACHED CENTERLINE					
M 7820(113)	1.15	MODEL HAS NOT REACHED CENTERLINE					
LS 7820(113)	1.15	MODEL HAS NOT REACHED CENTERLINE					
US 7820(113)	1.15	MODEL HAS NOT REACHED CENTERLINE					
T 7821(113)	2.25	MODEL HAS NOT REACHED CENTERLINE					
US 7821(113)	2.25	MODEL HAS NOT REACHED CENTERLINE					
M 7821(113)	2.25	MODEL HAS NOT REACHED CENTERLINE					
LS 7821(113)	2.25	MODEL HAS NOT REACHED CENTERLINE					
INJECT TIME = 2.68							
T 7822(113)	3.33	1.466E-03	0.076	1.808E-03	0.092	2.047E-03	0.112
M 7822(113)	3.33	1.466E-03	0.076	1.808E-03	0.092	2.047E-03	0.112
LS 7822(113)	3.33	1.466E-03	0.076	1.808E-03	0.092	2.047E-03	0.112
US 7822(113)	3.33	1.466E-03	0.076	1.808E-03	0.092	2.047E-03	0.112
T 7823(113)	4.41	1.466E-03	0.076	1.808E-03	0.092	2.047E-03	0.112
M 7823(113)	4.41	1.466E-03	0.076	1.808E-03	0.092	2.047E-03	0.112
LS 7823(113)	4.41	1.466E-03	0.076	1.808E-03	0.092	2.047E-03	0.112
US 7823(113)	4.41	1.466E-03	0.076	1.808E-03	0.092	2.047E-03	0.112
T 7824(113)	5.48	1.466E-03	0.076	1.808E-03	0.092	2.047E-03	0.112
M 7824(113)	5.48	1.466E-03	0.076	1.808E-03	0.092	2.047E-03	0.112
LS 7824(113)	5.48	1.466E-03	0.076	1.808E-03	0.092	2.047E-03	0.112
US 7824(113)	5.48	1.466E-03	0.076	1.808E-03	0.092	2.047E-03	0.112
T 7825(113)	6.51	1.466E-03	0.076	1.808E-03	0.092	2.047E-03	0.112
M 7825(113)	6.51	1.466E-03	0.076	1.808E-03	0.092	2.047E-03	0.112
LS 7825(113)	6.51	1.466E-03	0.076	1.808E-03	0.092	2.047E-03	0.112
US 7825(113)	6.51	1.466E-03	0.076	1.808E-03	0.092	2.047E-03	0.112
T 7826(113)	7.54	1.466E-03	0.076	1.808E-03	0.092	2.047E-03	0.112
M 7826(113)	7.54	1.466E-03	0.076	1.808E-03	0.092	2.047E-03	0.112
LS 7826(113)	7.54	1.466E-03	0.076	1.808E-03	0.092	2.047E-03	0.112
US 7826(113)	7.54	1.466E-03	0.076	1.808E-03	0.092	2.047E-03	0.112

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UNCLASSIFIED  
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6/29/73

NASA-RI ORBITER HEATING

Y4289

AEDC(ARO,INC.) ARNOLD AFS, TENNESSEE  
VON KARMAN GAS DYNAMICS FACILITY  
50 INCH HYPERSONIC TUNNEL #

GROUP CONFIG MODEL MACH NO PO(PSTIA) TOIDEG RI ALPHA-MODEL ALPHA-SECTOR ALPHA-PREBEND ROLL-MODEL YAW  
# 1 MATEC 7.96 122.8 1204 -.05 .05 0 180.00 -.00

T-1AF P-1NF Q-1NF V-1NF RMO-1NF MU-1NF PE/FT MREF STREF  
(DEG R) (PSIA) (PSIA) (FT/SEC) (SLUGS/FT3) (LB-SEC/FT2) (FT-LB) (R=.0175FT) (R=.0175FT)  
88.1 .013 .576 3660 1.237E-05 7.091E-08 6.388E 05 1.840E-02 5.140E-02

CAMERA ROLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHOXCN) TBAR(TOI) BETAITOI  
TOP(T) 8223  
UPPER SIDE(LS) 7766 113 83 .0475 4.537E-02 4.1685E-02  
LOWER SIDE(LS) 7908  
BOTTOM(B) 8234

PIC NO	TIME	DELTIME	H(TOI)	H(TOI)/HREF	H(1.910)	H(1.910)/HREF	H(.8510)	M(.8510)/HREF	ST(TOI)
US 7462(113)	7.68	6.18	7.965E-04	.0433	9.823E-04	.0534	1.112E-03	.0605	2.208E-03
T 7427(113)	8.74	7.23	7.363E-04	.0400	9.031E-04	.0494	1.028E-03	.0559	2.041E-03
M 3675(113)	8.74	7.23	7.363E-04	.0400	9.031E-04	.0494	1.028E-03	.0559	2.041E-03
LS 1859(113)	8.74	7.23	7.363E-04	.0400	9.031E-04	.0494	1.028E-03	.0559	2.041E-03
US 7863(113)	8.76	7.24	7.350E-04	.0399	9.056E-04	.0493	1.027E-03	.0558	2.036E-03
T 7428(113)	9.81	8.31	6.870E-04	.0373	8.473E-04	.0460	9.595E-04	.0521	1.902E-03
M 3676(113)	9.81	8.31	6.870E-04	.0373	8.473E-04	.0460	9.595E-04	.0521	1.902E-03
LS 1860(113)	9.81	8.31	6.870E-04	.0373	8.473E-04	.0460	9.595E-04	.0521	1.902E-03
US 7864(113)	9.84	8.33	6.839E-04	.0373	8.460E-04	.0460	9.580E-04	.0521	1.902E-03
T 7429(113)	10.89	9.38	6.464E-04	.0351	7.972E-04	.0433	9.028E-04	.0491	1.792E-03
M 3677(113)	10.89	9.38	6.464E-04	.0351	7.972E-04	.0433	9.028E-04	.0491	1.792E-03
LS 1861(113)	10.89	9.38	6.464E-04	.0351	7.972E-04	.0433	9.028E-04	.0491	1.792E-03
US 7865(113)	10.91	9.41	6.455E-04	.0351	7.961E-04	.0433	9.016E-04	.0490	1.788E-03
T 7430(113)	11.56	10.46	6.122E-04	.0333	7.551E-04	.0410	8.551E-04	.0464	1.695E-03
M 3678(113)	11.56	10.46	6.122E-04	.0333	7.551E-04	.0410	8.551E-04	.0464	1.695E-03
LS 1862(113)	11.59	10.49	6.115E-04	.0333	7.542E-04	.0410	8.541E-04	.0464	1.697E-03
US 7866(113)	11.59	10.49	6.115E-04	.0333	7.542E-04	.0410	8.541E-04	.0464	1.697E-03
T 7431(113)	11.54	11.54	5.830E-04	.0317	7.190E-04	.0391	8.142E-04	.0443	1.616E-03
M 3679(113)	11.54	11.54	5.830E-04	.0317	7.190E-04	.0391	8.142E-04	.0443	1.616E-03
LS 1863(113)	11.54	11.54	5.823E-04	.0316	7.182E-04	.0390	8.133E-04	.0442	1.613E-03
US 7867(113)	11.56	12.64	5.570E-04	.0303	6.870E-04	.0373	7.779E-04	.0423	1.544E-03
T 7432(113)	14.14	12.64	5.570E-04	.0303	6.870E-04	.0373	7.779E-04	.0423	1.544E-03
M 3680(113)	14.14	12.64	5.570E-04	.0303	6.870E-04	.0373	7.779E-04	.0423	1.544E-03
LS 1864(113)	14.14	12.64	5.564E-04	.0302	6.863E-04	.0373	7.772E-04	.0422	1.541E-03
US 7868(113)	14.17	12.66	5.564E-04	.0302	6.863E-04	.0373	7.772E-04	.0422	1.541E-03

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## NASA-DI ORBITER HEATING

VA2R9

AEDC (ARO, INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL R

GROUP	CONFIG	MODEL	MACH NO	PO (PSIA)	TO (DEG R)	ALPHA-MODEL	ALPHA-SECTOR	ALPHA-PREBEND	ROLL-MODEL	YAW
R	1	MATED	7.96	122.9	1204	-.05	.05	0	180.00	-.00
T-1NF	P-1NF	Q-1NF	V-1NF	RHO-1NF	MU-1NF	RE/FT	HREF	STREF		
(DEG R)	(PSIA)	(FT/SEC)	(SLUGS/FT <sup>3</sup> )	(LBS-SEC/FT <sup>2</sup> )	(FT-1)	(R <sup>2</sup> .0175FT)	(R <sup>2</sup> .0175FT)	(R <sup>2</sup> .0175FT)		
88.1	.013	.577	3660	1.239E-05	7.090E-08	6.395E-05	1.840E-02	5.138E-02		
CAMERA	ROLL NO	PAINT TEMP (DEG F)	INITIAL TEMP (DEG F)	SQUARE ROOT (RHO/CXK)	TRAR (TO)	BETA (TO)				
TOP (T)	8223									
UPPER SIDE (US)	7766									
LOWER SIDE (LS)	7508									
BOTTOM (B)	8234									

PIC NO	TIME DELT (SEC)	H (TO)	H (TO)/HREF	M (TO)	M (TO)/HREF	H (.85 TO)	M (.85 TO)	H (.85 TO)/HREF	ST (TO)
T 7833 (113)	15.22	5.347E-04	.0291	6.594E-04	.0358	7.468E-04	.0406	1.482E-03	1.482E-03
M 3681 (113)	15.22	5.347E-04	.0291	6.594E-04	.0358	7.468E-04	.0406	1.482E-03	1.482E-03
LS 1965 (113)	15.22	5.347E-04	.0291	6.594E-04	.0358	7.468E-04	.0406	1.482E-03	1.482E-03
US 7859 (113)	15.22	5.342E-04	.0290	6.594E-04	.0358	7.468E-04	.0406	1.482E-03	1.482E-03
T 7834 (113)	16.29	5.149E-04	.0280	6.300E-04	.0345	7.191E-04	.0391	1.426E-03	1.426E-03
M 3682 (113)	16.29	5.149E-04	.0280	6.300E-04	.0345	7.191E-04	.0391	1.426E-03	1.426E-03
LS 1966 (113)	16.29	5.149E-04	.0280	6.300E-04	.0345	7.191E-04	.0391	1.426E-03	1.426E-03
US 7835 (113)	16.32	5.144E-04	.0270	6.300E-04	.0345	7.191E-04	.0391	1.426E-03	1.426E-03
T 7836 (113)	17.37	4.971E-04	.0270	6.131E-04	.0333	6.943E-04	.0377	1.378E-03	1.378E-03
M 3683 (113)	17.37	4.971E-04	.0270	6.131E-04	.0333	6.943E-04	.0377	1.378E-03	1.378E-03
LS 1967 (113)	17.37	4.971E-04	.0270	6.131E-04	.0333	6.943E-04	.0377	1.378E-03	1.378E-03
US 7871 (113)	17.40	4.947E-04	.0261	5.933E-04	.0322	6.714E-04	.0365	1.331E-03	1.331E-03
T 7836 (113)	18.45	4.810E-04	.0261	5.933E-04	.0322	6.714E-04	.0365	1.331E-03	1.331E-03
M 3684 (113)	18.45	4.810E-04	.0261	5.933E-04	.0322	6.714E-04	.0365	1.331E-03	1.331E-03
LS 1968 (113)	18.47	4.807E-04	.0261	5.933E-04	.0322	6.714E-04	.0365	1.331E-03	1.331E-03
US 7872 (113)	18.47	4.807E-04	.0261	5.933E-04	.0322	6.714E-04	.0365	1.331E-03	1.331E-03
T 7837 (113)	19.52	4.665E-04	.0254	5.753E-04	.0313	6.515E-04	.0354	1.291E-03	1.291E-03
M 3685 (113)	19.52	4.665E-04	.0254	5.753E-04	.0313	6.515E-04	.0354	1.291E-03	1.291E-03
LS 1969 (113)	19.55	4.661E-04	.0253	5.749E-04	.0312	6.510E-04	.0354	1.291E-03	1.291E-03
US 7873 (113)	19.55	4.661E-04	.0253	5.749E-04	.0312	6.510E-04	.0354	1.291E-03	1.291E-03
T 7838 (113)	20.60	4.531E-04	.0245	5.599E-04	.0304	6.328E-04	.0344	1.254E-03	1.254E-03
M 3686 (113)	20.60	4.531E-04	.0245	5.599E-04	.0304	6.328E-04	.0344	1.254E-03	1.254E-03
LS 1970 (113)	20.62	4.528E-04	.0245	5.595E-04	.0304	6.325E-04	.0344	1.255E-03	1.255E-03
US 7874 (113)	20.62	4.528E-04	.0245	5.595E-04	.0304	6.325E-04	.0344	1.255E-03	1.255E-03
T 7839 (113)	21.67	4.409E-04	.0240	5.437E-04	.0296	6.158E-04	.0335	1.222E-03	1.222E-03
M 3687 (113)	21.67	4.409E-04	.0240	5.437E-04	.0296	6.158E-04	.0335	1.222E-03	1.222E-03

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## NASA-RI ORBITER HEATING

VA289

AEDC(ARO, INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL R

GROUP	CONFIG	MODEL	MACH NO	PO(P/SIA)	TO( DEG R)	ALPHA-MODEE	ALPHA-SECTOR	ALPHA-PREBEND	ROLL-MODEL	YAW
8	1	MATED	7.96	122.8	1204	-0.05	0.05	0	180.00	-0.00
T-1AF P-INF Q-INF V-INF MU-INF RE/FT HREF STREF (DEG R) (PSIA) (PSIA) (FT/SEC) (SLUGS/FT3) (LR-SEC/FT2) (FT-1) (R= .0175F1) (R= .0175F1) 88.0 .013 .576 3660 1.238E-05 7.888E-08 6.391E 05 1.840E-02 5.139E-02										
CAMERA ROLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHOKCKX) TRAR(TO) BETA(TO)										
TOP(T)	8223									
UPPER SIDE(US)	7766									
LOWER SIDE(LS)	7508									
MOTIC(MR)	8234									

PIC NO	TIME	DELTIME	MITO1	MITO1/HREF	M(.9TO)	M(.9TO)/HREF	M(.85TO)	M(.85TO)/HREF	ST(TO)
US 7875(113)	21.70	20.26	4.408E-04	.0239	5.434E-04	.0295	6.154E-04	.0334	1.219E-03
LS 1871(113)	21.70	20.26	4.408E-04	.0239	5.434E-04	.0295	6.154E-04	.0334	1.219E-03
T 7841(113)	22.78	21.27	4.293E-04	.0233	5.295E-04	.0288	5.996E-04	.0326	1.189E-03
M 3698(113)	22.78	21.27	4.293E-04	.0233	5.295E-04	.0288	5.996E-04	.0326	1.189E-03
LS 1872(113)	22.78	21.27	4.293E-04	.0233	5.295E-04	.0288	5.996E-04	.0326	1.189E-03
US 7876(113)	22.80	21.30	4.290E-04	.0233	5.292E-04	.0288	5.993E-04	.0326	1.188E-03
T 7841(113)	23.83	22.32	4.191E-04	.0228	5.169E-04	.0281	5.853E-04	.0318	1.162E-03
M 3698(113)	23.83	22.32	4.191E-04	.0228	5.169E-04	.0281	5.853E-04	.0318	1.162E-03
LS 1877(113)	23.85	22.35	4.188E-04	.0228	5.166E-04	.0281	5.850E-04	.0318	1.160E-03
US 7873(113)	23.85	22.35	4.188E-04	.0228	5.166E-04	.0281	5.850E-04	.0318	1.160E-03
T 7842(113)	24.50	23.40	4.093E-04	.0222	5.048E-04	.0274	5.717E-04	.0311	1.134E-03
M 3690(113)	24.50	23.40	4.093E-04	.0222	5.048E-04	.0274	5.717E-04	.0311	1.134E-03
LS 1874(113)	24.53	23.43	4.091E-04	.0222	5.046E-04	.0274	5.714E-04	.0310	1.133E-03
US 7874(113)	24.53	23.43	4.091E-04	.0222	5.046E-04	.0274	5.714E-04	.0310	1.133E-03
T 7843(113)	25.58	24.48	4.002E-04	.0217	4.936E-04	.0268	5.590E-04	.0304	1.109E-03
M 3691(113)	25.58	24.48	4.002E-04	.0217	4.936E-04	.0268	5.590E-04	.0304	1.109E-03
LS 1875(113)	26.00	24.50	4.000E-04	.0217	4.934E-04	.0268	5.587E-04	.0304	1.109E-03
US 7875(113)	26.00	24.50	4.000E-04	.0217	4.934E-04	.0268	5.587E-04	.0304	1.109E-03
T 7844(113)	27.66	26.15	3.872E-04	.0210	4.773E-04	.0259	5.404E-04	.0294	1.071E-03
M 3692(113)	27.66	26.15	3.872E-04	.0210	4.773E-04	.0259	5.404E-04	.0294	1.071E-03
LS 1876(113)	27.68	26.18	3.870E-04	.0210	4.773E-04	.0259	5.405E-04	.0294	1.071E-03
US 7876(113)	27.68	26.18	3.870E-04	.0210	4.773E-04	.0259	5.405E-04	.0294	1.071E-03
T 7845(113)	29.76	28.25	3.725E-04	.0202	4.594E-04	.0250	5.203E-04	.0283	1.033E-03
M 3693(113)	29.76	28.25	3.725E-04	.0202	4.594E-04	.0250	5.203E-04	.0283	1.033E-03
LS 1877(113)	29.76	28.26	3.725E-04	.0202	4.594E-04	.0250	5.203E-04	.0283	1.033E-03

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## NASA-RI ORBITER HEATING

VA286

AEDCIAR, INC., ARNOLD AFS, TENNESSEE  
VON KARMAN GAS DYNAMICS FACILITY  
50 INCH HYPERSONIC TUNNEL B

6/29/73

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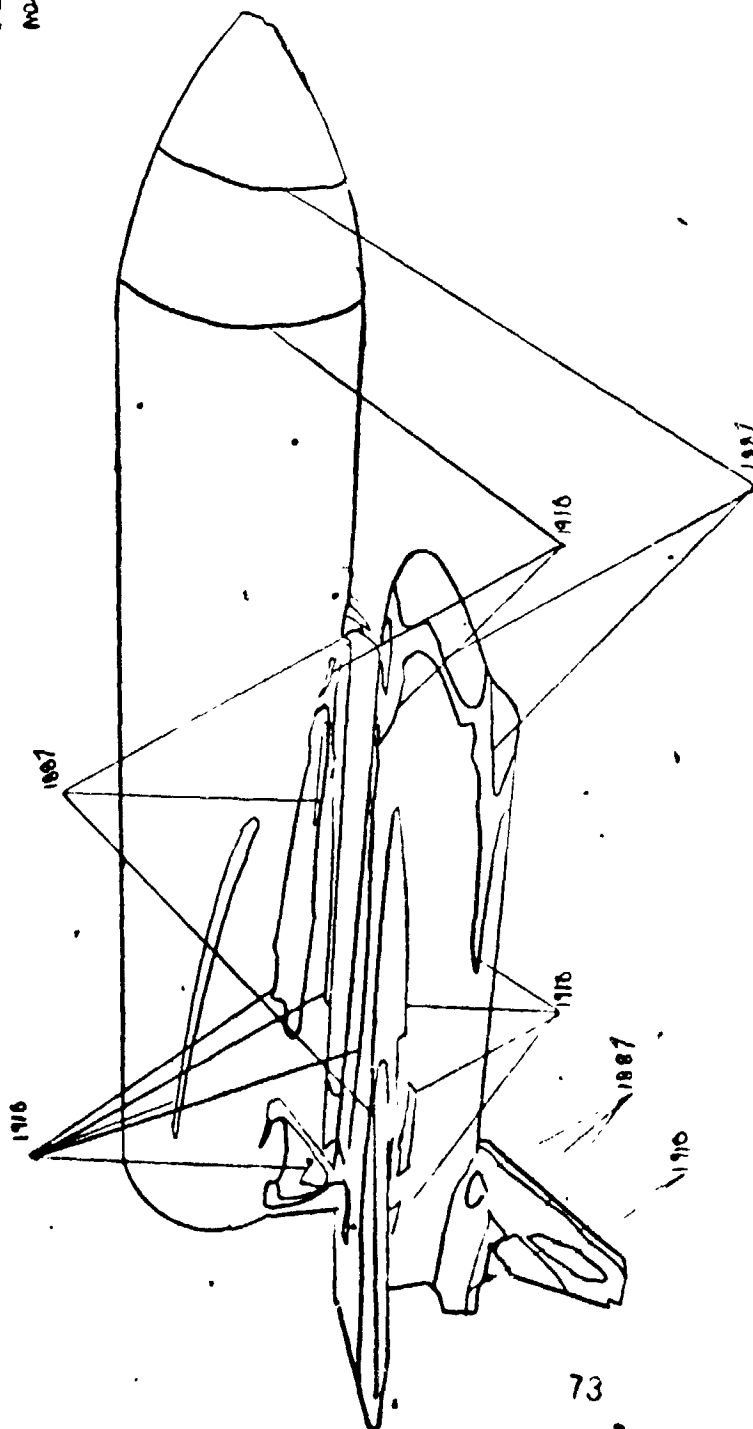
GROUP	CNTG	MODEL	MACH NO	PO(PISA)	TO(IDEG)	ALPHA-MODEL	ALPHA-SECTOR	ALPHA-PREBEND	ROLL-MODEL	YAW
8	1	MATED	7.96	122.8	1204	-0.05	.05	0	180.00	-0.00
T-INF	P-INF	O-INF	V-INF	PHO-INF	MU-INF	UE/FT	HREF	STREF		
(DEG R)	(PSIA)	(PSIA)	(FT/SEC)	(SLUGS/FT <sup>3</sup> )	(LR-SEC/FT <sup>2</sup> )	(FT-1)	(R= .0175FT)	(R= .0175FT)		
88.1	.013	.576	3660	1.238E-05	7.089E-08	6.390E 05	1.840E-02	5.140E-02		
CAMERA	ROLL NO	PAINT TEMP (DEG F)	INITIAL TEMP (DEG F)	SQUARE ROOT (RHOXCK)	TRAR(TO)	BETA(TO)				
TOP(T)	8223									
UPPER SIDE(LS)	7766									
LOWER SIDE(LS)	7508									
MOT(MR)	8234									

PIC NO	TIME DELTIME	M(TO)	M(TO)/HREF	M(.9TO)	M(.9TO)/HREF	M(.85TO)	M(.85TO)/HREF	ST(TO)
US 7891(113)	28.78	3.723E-04	.0202	4.592E-04	.0249	5.200E-04	.0282	1.031E-03
T 7846(113)	31.84	3.595E-04	.0195	4.434E-04	.0241	5.021E-04	.0273	9.951E-04
M 3694(113)	31.84	3.595E-04	.0195	4.434E-04	.0241	5.021E-04	.0273	9.951E-04
LS 1878(113)	31.84	3.595E-04	.0195	4.434E-04	.0241	5.021E-04	.0273	9.951E-04
US 7842(113)	31.86	3.548E-04	.0195	4.432E-04	.0241	5.019E-04	.0273	9.955E-04
T 7847(113)	33.79	3.485E-04	.0189	4.298E-04	.0234	4.867E-04	.0265	9.657E-04
M 3695(113)	33.79	3.485E-04	.0189	4.298E-04	.0234	4.867E-04	.0265	9.657E-04
LS 1879(113)	33.79	3.485E-04	.0189	4.298E-04	.0234	4.867E-04	.0265	9.657E-04
US 7843(113)	33.81	3.483E-04	.0189	4.298E-04	.0233	4.865E-04	.0264	9.648E-04
T 7848(113)	35.87	3.378E-04	.0184	4.168E-04	.0226	4.719E-04	.0256	9.357E-04
M 3696(113)	35.87	3.378E-04	.0184	4.168E-04	.0226	4.719E-04	.0256	9.357E-04
LS 1880(113)	35.87	3.378E-04	.0184	4.168E-04	.0226	4.719E-04	.0256	9.357E-04
US 7844(113)	35.89	3.377E-04	.0184	4.168E-04	.0226	4.716E-04	.0256	9.360E-04
MODEL HAS LEFT CENTERLINE								
T 7849(113)	37.92	3.240E-04	.0178	4.046E-04	.0220	4.581E-04	.0249	9.086E-04
M 3697(113)	37.94	3.240E-04	.0178	4.046E-04	.0220	4.581E-04	.0249	9.086E-04
LS 1881(113)	37.94	3.240E-04	.0178	4.046E-04	.0220	4.581E-04	.0249	9.086E-04
US 7885(113)	37.97	3.219E-04	.0178	4.046E-04	.0220	4.581E-04	.0249	9.086E-04
T 7850(113)	40.02	3.140E-04	.0173	3.932E-04	.0214	4.454E-04	.0242	8.823E-04
M 3698(113)	40.02	3.140E-04	.0173	3.932E-04	.0214	4.454E-04	.0242	8.823E-04
LS 1882(113)	40.05	3.149E-04	.0173	3.934E-04	.0214	4.455E-04	.0242	8.842E-04
US 7886(113)	40.05	3.149E-04	.0173	3.934E-04	.0214	4.455E-04	.0242	8.842E-04

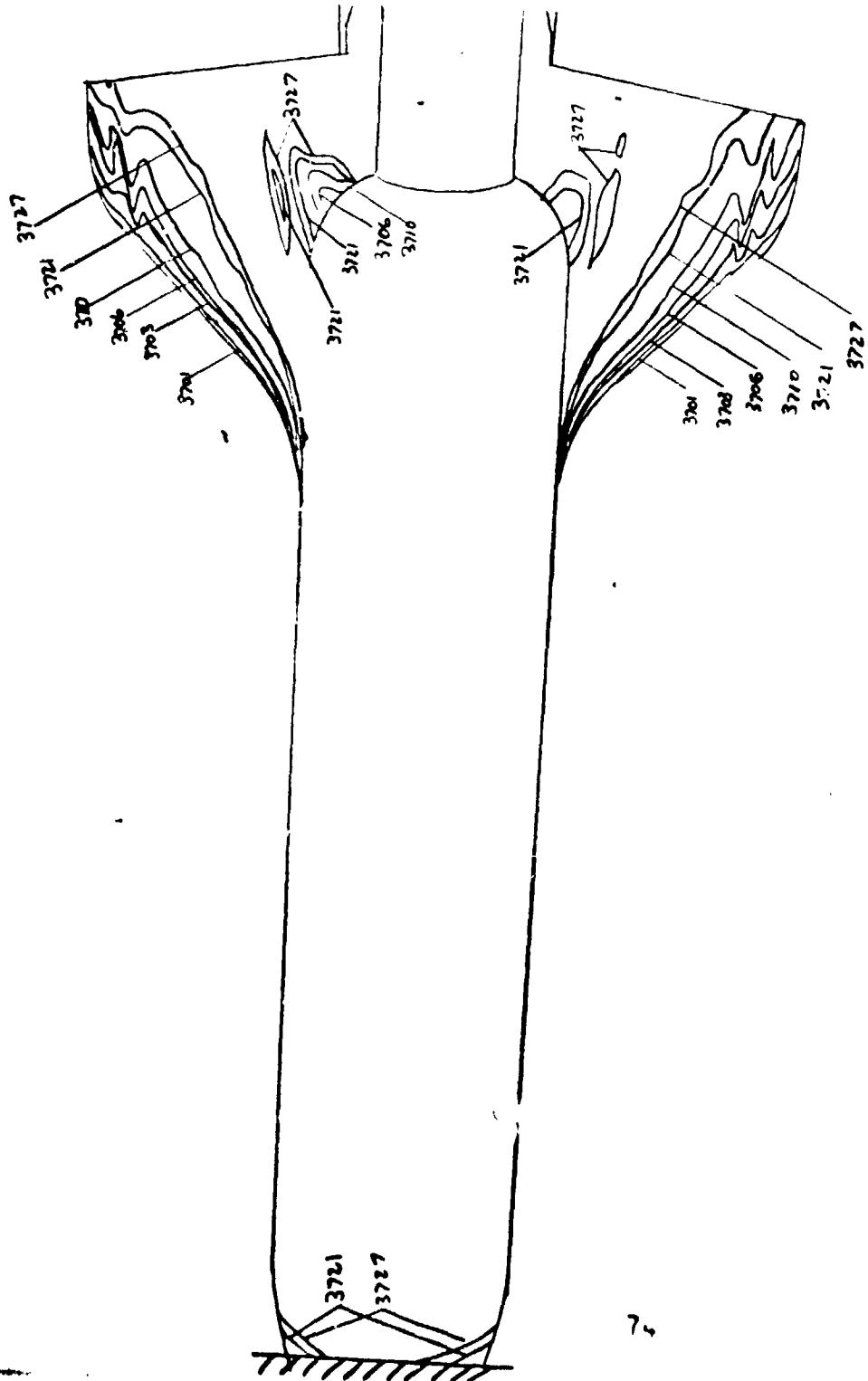
C62



Group 9  
7908  
Lower Side  
MD

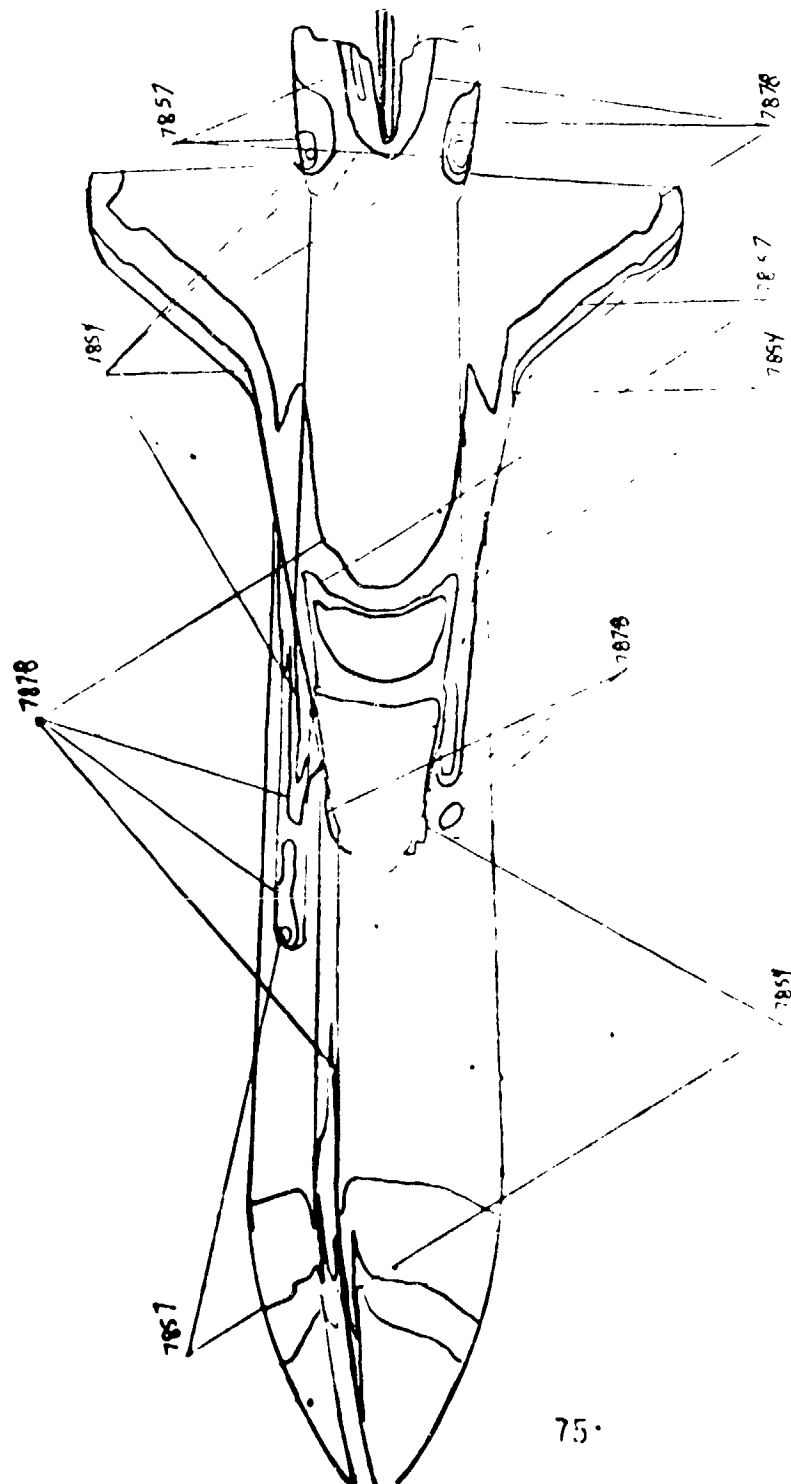


8234  
GP9  
Bottom



CWC

Group 9  
8223  
Top  
md





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6/29/73

NASA-RI ORBITER HEATING

VA249

AEDCIARO, INC.) ARNOLD AFS, TENNESSEE  
VON KARMAN GAS DYNAMICS FACILITY  
50 INCH HYPERSONIC TUNNEL R

GROUP CONFIG MODEL MACH NO PRIPSTA) TO( DEG R) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREBEND ROLL-MODEL YAW

9 1 MATED 7.96 122.1 1202 .05 .05 0 0 0

T-1AF P-1AF Q-1AF V-1AF MU-1AF RU-1AF RE/FT MREF STREF  
(DEG R) (PSIA) (FT/SEC) (SLUGS/FT<sup>3</sup>) (LR-SEC/FT<sup>2</sup>) (FT-1) (R= .0175FT) (R= .0175FT)

87.9 .013 .573 3657 1.233E-05 7.078E-08 6.369E 05 1.814E-02 5.150E-02

CAMERA ROLL NO PAINT TEMP DEG F INITIAL TEMP (DEG F) SQUARE ROOT (RHOCXK) TRAR(ITO) BETA(ITO)

TOP(T) 8223 79 .0475 0 0

UPPER SIDE(UIS) 7766 113

LOWER SIDE(LS) 7508

MOTOM(R) 8234

PIC NO TIME DELTME M(TOI) M(TOI)/MREF M(.910) MREF M(.8510) MREF ST(ITO)

T 7451(113) 1.15 1.676E-03 .0913 2.067E-03 .1126 2.341E-03 .1275 4.659E-03

M 7451(113) 1.15 1.645E-03 .0907 2.053E-03 .1118 2.325E-03 .1266 4.627E-03

US 7451(113) 1.15 1.645E-03 .0907 2.053E-03 .1118 2.325E-03 .1266 4.627E-03

LS 7451(113) 1.15 1.645E-03 .0907 2.053E-03 .1118 2.325E-03 .1266 4.627E-03

M 7451(113) 1.15 1.645E-03 .0907 2.053E-03 .1118 2.325E-03 .1266 4.627E-03

US 7451(113) 1.15 1.645E-03 .0907 2.053E-03 .1118 2.325E-03 .1266 4.627E-03

LS 7451(113) 1.15 1.645E-03 .0907 2.053E-03 .1118 2.325E-03 .1266 4.627E-03

M 7451(113) 1.15 1.645E-03 .0907 2.053E-03 .1118 2.325E-03 .1266 4.627E-03

US 7451(113) 1.15 1.645E-03 .0907 2.053E-03 .1118 2.325E-03 .1266 4.627E-03

LS 7451(113) 1.15 1.645E-03 .0907 2.053E-03 .1118 2.325E-03 .1266 4.627E-03

M 7451(113) 1.15 1.645E-03 .0907 2.053E-03 .1118 2.325E-03 .1266 4.627E-03

US 7451(113) 1.15 1.645E-03 .0907 2.053E-03 .1118 2.325E-03 .1266 4.627E-03

LS 7451(113) 1.15 1.645E-03 .0907 2.053E-03 .1118 2.325E-03 .1266 4.627E-03

M 7451(113) 1.15 1.645E-03 .0907 2.053E-03 .1118 2.325E-03 .1266 4.627E-03

US 7451(113) 1.15 1.645E-03 .0907 2.053E-03 .1118 2.325E-03 .1266 4.627E-03

LS 7451(113) 1.15 1.645E-03 .0907 2.053E-03 .1118 2.325E-03 .1266 4.627E-03

M 7451(113) 1.15 1.645E-03 .0907 2.053E-03 .1118 2.325E-03 .1266 4.627E-03

US 7451(113) 1.15 1.645E-03 .0907 2.053E-03 .1118 2.325E-03 .1266 4.627E-03

LS 7451(113) 1.15 1.645E-03 .0907 2.053E-03 .1118 2.325E-03 .1266 4.627E-03

M 7451(113) 1.15 1.645E-03 .0907 2.053E-03 .1118 2.325E-03 .1266 4.627E-03

US 7451(113) 1.15 1.645E-03 .0907 2.053E-03 .1118 2.325E-03 .1266 4.627E-03

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NASA-R1 ORBITER HEATING

VA2A9

AEDC(ARO, INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL R

GROUP	CONFIG	MODEL	MACH NO	PO(PSTIA)	TO( DEG R)	ALPHA-MODEL	ALPHA-SECTOR	ALPHA-PREBEND	ROLL-MODEL	YAW
4	1	WATEC	7.96	122.5	1202	.05	.05	0	0	0
T-1NF	P-1NF	Q-1NF	V-1NF	RHO-1NF	MU-1NF	PE/FT	MHEF	STREF		
(DEG R)	(PSTIA)	(FT/SEC)	(FT/SEC)	(SLUGS/FT <sup>3</sup> )	(LBS-SEC/FT <sup>2</sup> )	(FT-1)	(R= .0175FT)	(R= .0175FT)		
87.9	.813	.575	3657	1.278E-05	7.078E-08	6.395E 05	1.838E-02	5.139E-02		
CAMFRA	ROLL NO	PAINT TEMP (DEG F)	INITIAL TEMP (DEG F)	SQUARE ROOT (RHOXCAK)	TRANS(10)	BETA(10)				
TOP(1)	8223									
UPPER SIDE(US)	7166									
LOWER SIDE(LS)	7908									
MOTTCM(18)	8234									

PIC NO	TIME DELT(SEC)	M(10)	M(10)/MREF	M(10)	M(10)/MREF	M(10)	M(10)/MREF	M(10)	M(10)/MREF	ST(10)
7 7458(113)	8.68	7.1P	.0457	1.035E-03	.0563	1.172E-03	.0638	1.172E-03	.0638	2.327E-03
LS 7404(113)	8.68	7.1P	.0457	1.035E-03	.0563	1.172E-03	.0638	1.172E-03	.0638	2.327E-03
US 7404(113)	8.68	7.1P	.0457	1.035E-03	.0563	1.172E-03	.0638	1.172E-03	.0638	2.327E-03
US 7404(113)	8.71	7.21	.0456	1.033E-03	.0562	1.170E-03	.0637	1.170E-03	.0637	2.325E-03
M 7407(113)	9.74	8.23	.0426	9.667E-04	.0526	1.095E-03	.0595	1.095E-03	.0595	2.171E-03
T 7459(113)	9.76	8.24	.0426	9.652E-04	.0525	1.093E-03	.0595	1.093E-03	.0595	2.170E-03
US 7495(113)	9.76	8.24	.0426	9.652E-04	.0525	1.093E-03	.0595	1.093E-03	.0595	2.170E-03
LS 1491(113)	10.61	9.31	.0401	9.091E-04	.0494	1.029E-03	.0560	1.029E-03	.0560	2.042E-03
T 7460(113)	10.61	9.31	.0401	9.091E-04	.0494	1.029E-03	.0560	1.029E-03	.0560	2.042E-03
LS 1492(113)	10.61	9.31	.0401	9.091E-04	.0494	1.029E-03	.0560	1.029E-03	.0560	2.042E-03
US 7496(113)	10.64	9.31	.0400	9.079E-04	.0494	1.029E-03	.0559	1.029E-03	.0559	2.041E-03
T 7461(113)	11.89	10.39	.0380	8.607E-04	.0468	9.746E-04	.0530	9.746E-04	.0530	1.933E-03
M 7409(113)	11.89	10.39	.0380	8.607E-04	.0468	9.746E-04	.0530	9.746E-04	.0530	1.933E-03
LS 1493(113)	11.89	10.39	.0379	8.597E-04	.0467	9.734E-04	.0529	9.734E-04	.0529	1.930E-03
US 7497(113)	11.91	10.41	.0361	8.193E-04	.0445	9.277E-04	.0504	9.277E-04	.0504	1.834E-03
T 7462(113)	12.56	11.44	.0341	8.193E-04	.0445	9.277E-04	.0504	9.277E-04	.0504	1.834E-03
LS 1494(113)	12.56	11.44	.0341	8.193E-04	.0445	9.277E-04	.0504	9.277E-04	.0504	1.834E-03
US 7498(113)	12.59	11.49	.0361	8.193E-04	.0445	9.277E-04	.0504	9.277E-04	.0504	1.834E-03
T 7463(113)	14.04	12.54	.0345	7.833E-04	.0426	8.870E-04	.0482	8.870E-04	.0482	1.758E-03
M 7411(113)	14.04	12.54	.0345	7.833E-04	.0426	8.870E-04	.0482	8.870E-04	.0482	1.758E-03
LS 1495(113)	14.04	12.54	.0345	7.833E-04	.0426	8.870E-04	.0482	8.870E-04	.0482	1.758E-03
US 7499(113)	14.07	12.56	.0345	7.826E-04	.0425	8.861E-04	.0481	8.861E-04	.0481	1.755E-03
T 7464(113)	15.12	13.61	.0331	7.517E-04	.0408	8.512E-04	.0462	8.512E-04	.0462	1.685E-03
M 7412(113)	15.12	13.61	.0331	7.517E-04	.0408	8.512E-04	.0462	8.512E-04	.0462	1.685E-03
LS 1496(113)	15.12	13.61	.0331	7.517E-04	.0408	8.512E-04	.0462	8.512E-04	.0462	1.685E-03

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## NASA-RI ORBITER HEATING

VA289

AEDC(AR, INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL R

GROUP	CONFIG	MODEL	MACH NO	PO(PSIA)	TO(DEG R)	ALPHA-MODEL	ALPHA-SECTOR	ALPHA-PREBEND	ROLL-MODEL	YAW
9	1	MAYED	7.96	123.1	1202	.05	.05	0	0	0
T-INF	P-INF	Q-INF	V-INF	RNO-INF	MU-INF	RE/FT	MREF	STREF		
(DEG R)	(PSIA)	(FT/SEC)	(SLUGS/FT <sup>3</sup> )	(LBS-SEC/FT <sup>2</sup> )	(FT-1)	(R= .0175FT)	(IN= .0175FT)			
87.9	.013	.572	3657	1.243E-05	7.079E-08	6.420E 05	1.041E-02	5.129E-02		
CAMERA	ROLL NO	PAINT TEMP (DEG F)	INITIAL TEMP (DEG F)	SQUARE ROOT (RMXCHK)	TRAR(TO)	BETA(TO)				
TOP(T)	8223									
UPPER SINE(US)	7766									
LOWER SINE(LS)	7608									
NOTCH(N)	8234									

PIC NO	TIME DELTIME	M(TO)	M(TO)/MREF	M(.9TO)	M(.9TO)/MREF	M(.85TO)	M(.85TO)/MREF	ST(TO)
US 7400(113)	15.14	6.040E-04	.0331	7.510E-04	.0408	8.504E-04	.0462	1.686E-03
T 7465(113)	16.19	5.868E-04	.0319	7.237E-04	.0393	8.194E-04	.0445	1.623E-03
M 7713(113)	16.19	5.848E-04	.0319	7.237E-04	.0393	8.194E-04	.0445	1.623E-03
LS 7471(113)	16.19	5.848E-04	.0319	7.237E-04	.0393	8.194E-04	.0445	1.623E-03
US 7401(113)	16.22	5.863E-04	.0318	7.231E-04	.0393	8.187E-04	.0445	1.620E-03
T 7466(113)	17.27	5.664E-04	.0308	6.985E-04	.0379	7.909E-04	.0430	1.565E-03
M 7714(113)	17.27	5.664E-04	.0308	6.985E-04	.0379	7.909E-04	.0430	1.565E-03
LS 7402(113)	17.27	5.664E-04	.0308	6.985E-04	.0379	7.909E-04	.0430	1.565E-03
US 7403(113)	17.29	5.660E-04	.0308	6.980E-04	.0379	7.903E-04	.0429	1.565E-03
T 7467(113)	18.35	5.440E-04	.0298	6.759E-04	.0367	7.653E-04	.0416	1.515E-03
M 7715(113)	18.35	5.440E-04	.0298	6.759E-04	.0367	7.653E-04	.0416	1.515E-03
LS 7404(113)	18.35	5.440E-04	.0298	6.759E-04	.0367	7.653E-04	.0416	1.515E-03
US 7405(113)	18.37	5.476E-04	.0297	6.752E-04	.0366	7.647E-04	.0415	1.513E-03
T 7468(113)	19.42	5.313E-04	.0288	6.552E-04	.0356	7.419E-04	.0403	1.467E-03
M 7716(113)	19.42	5.313E-04	.0288	6.552E-04	.0356	7.419E-04	.0403	1.467E-03
LS 7406(113)	19.42	5.313E-04	.0288	6.552E-04	.0356	7.419E-04	.0403	1.467E-03
US 7407(113)	19.45	5.310E-04	.0288	6.548E-04	.0355	7.414E-04	.0402	1.466E-03
T 7469(113)	20.50	5.141E-04	.0280	6.364E-04	.0345	7.206E-04	.0391	1.424E-03
M 7717(113)	20.50	5.141E-04	.0280	6.364E-04	.0345	7.206E-04	.0391	1.424E-03
LS 7408(113)	20.50	5.141E-04	.0280	6.364E-04	.0345	7.206E-04	.0391	1.424E-03
US 7409(113)	20.52	5.157E-04	.0280	6.362E-04	.0345	7.201E-04	.0391	1.425E-03
T 7470(113)	21.57	5.020E-04	.0273	6.191E-04	.0336	7.010E-04	.0381	1.386E-03
M 7718(113)	21.57	5.020E-04	.0273	6.191E-04	.0336	7.010E-04	.0381	1.386E-03
LS 7410(113)	21.57	5.020E-04	.0273	6.191E-04	.0336	7.010E-04	.0381	1.386E-03
US 7411(113)	21.60	5.017E-04	.0272	6.187E-04	.0336	7.006E-04	.0380	1.384E-03

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NASA-BJ ORBITER HEATING

AECIARO, INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN CAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL 7

VA289

GROUP CONFIG MODEL MACH NO POI(PSIA) TO(DEG R) ALPHA-MODEL ALPHA-SECTION ALPHA-PREPEND ROLL-MODEL YAW

9 1 1 7.96 123.3 1202 .05 .05 0 0 0

T-INF P-INF O-INF V-INF RMO-INF MU-INF RF/FT MREF STREF

(DEG R) (PSIA) (PSIA) (FT/SEC) (SLUGS/FT<sup>3</sup>) (LR-SEC/FT<sup>2</sup>) (FT-1) (R=.0175FT) (R=.0175FT)

87.9 .013 .576 3657 1.745E-05 7.079E-08 6.430E 05 1.843E-02 5.125E-02

CAMERA ROLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHOXCRK) TRAR(TU) BETA(TO)

TOP(1) 8223 113 79 .0475 5.128E-02 4.7350E-02

UPPER SINE(US) 7766

LOWER SINE(LS) 7808

MOTION(M) 8234

PIC NO	TIME	M(TO)	M(TO)/MREF	M(.9TO)	M(.9TO)/MREF	M(.85TO)	M(.85TO)/MREF	ST(TO)
T 78711131	22.65	4.891E-04	.0263	6.032E-04	.0327	6.829E-04	.0370	1.348E-03
M 77141131	22.65	4.891E-04	.0265	6.032E-04	.0327	6.829E-04	.0370	1.348E-03
LS 16031131	22.65	4.891E-04	.0265	6.032E-04	.0327	6.829E-04	.0370	1.348E-03
US 79071131	22.68	4.888E-04	.0265	6.028E-04	.0327	6.825E-04	.0371	1.350E-03
T 78721131	22.50	4.742E-04	.0257	5.848E-04	.0317	6.621E-04	.0371	1.307E-03
M 77201131	22.50	4.742E-04	.0257	5.848E-04	.0317	6.621E-04	.0371	1.307E-03
LS 15041131	24.00	4.742E-04	.0257	5.848E-04	.0317	6.621E-04	.0371	1.307E-03
US 79041131	24.00	4.742E-04	.0257	5.848E-04	.0317	6.621E-04	.0371	1.307E-03
T 78731131	24.03	4.537E-04	.0246	5.595E-04	.0303	6.335E-04	.0344	1.251E-03
M 77211131	24.08	4.537E-04	.0246	5.595E-04	.0303	6.335E-04	.0344	1.251E-03
LS 19051131	26.11	4.535E-04	.0246	5.592E-04	.0303	6.332E-04	.0343	1.250E-03
US 79051131	26.11	4.535E-04	.0246	5.592E-04	.0303	6.332E-04	.0343	1.250E-03
T 78741131	26.16	4.356E-04	.0236	5.371E-04	.0291	6.083E-04	.0330	1.194E-03
M 77221131	26.16	4.356E-04	.0236	5.371E-04	.0291	6.083E-04	.0330	1.194E-03
LS 19061131	26.18	4.354E-04	.0236	5.370E-04	.0291	6.080E-04	.0330	1.194E-03
US 79061131	26.18	4.354E-04	.0236	5.370E-04	.0291	6.080E-04	.0330	1.194E-03
T 78751131	30.26	4.144E-04	.0227	5.172E-04	.0280	5.856E-04	.0317	1.154E-03
M 77231131	30.26	4.144E-04	.0227	5.172E-04	.0280	5.856E-04	.0317	1.154E-03
LS 19071131	30.26	4.142E-04	.0227	5.170E-04	.0280	5.854E-04	.0317	1.153E-03
US 79071131	30.26	4.142E-04	.0227	5.170E-04	.0280	5.854E-04	.0317	1.153E-03
T 78761131	32.24	4.050E-04	.0219	4.995E-04	.0271	5.656E-04	.0306	1.114E-03
M 77241131	32.24	4.050E-04	.0219	4.995E-04	.0271	5.656E-04	.0306	1.114E-03
LS 15081131	32.24	4.049E-04	.0219	4.993E-04	.0271	5.654E-04	.0306	1.114E-03
US 79081131	32.24	4.049E-04	.0219	4.993E-04	.0271	5.654E-04	.0306	1.114E-03
T 78771131	32.01	3.921E-04	.0212	4.835E-04	.0262	5.474E-04	.0296	1.077E-03
M 77251131	32.01	3.921E-04	.0212	4.835E-04	.0262	5.474E-04	.0296	1.077E-03
LS 19091131	32.01	3.921E-04	.0212	4.835E-04	.0262	5.474E-04	.0296	1.077E-03
US 79091131	32.01	3.921E-04	.0212	4.835E-04	.0262	5.474E-04	.0296	1.077E-03

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NASA-RT ORBITER HEATING

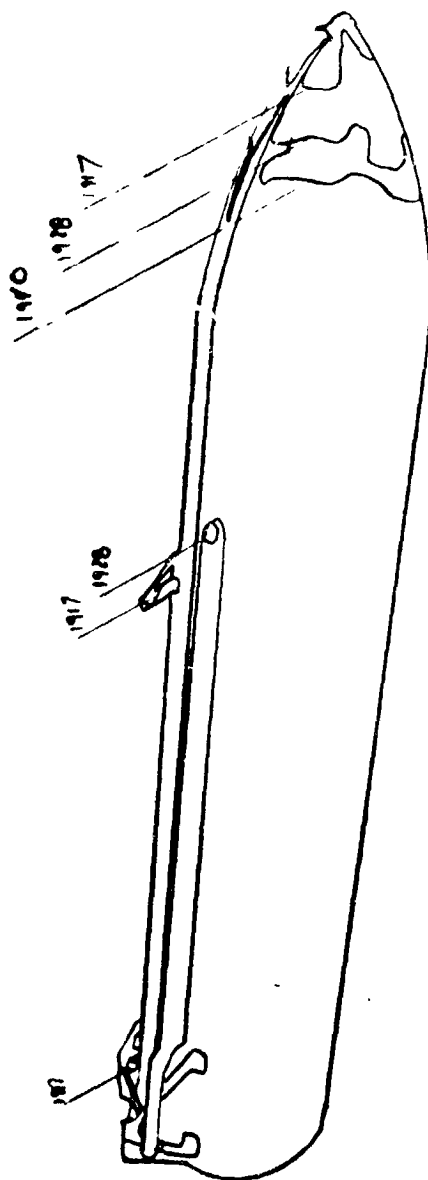
AEDC(ARO-INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL A

VA209

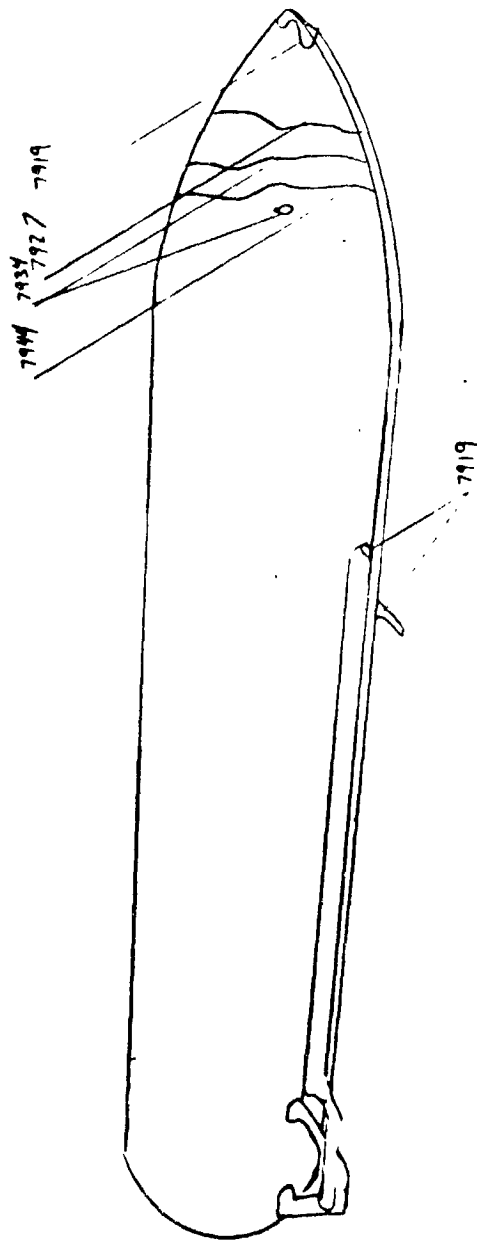
GROUP CONFIG MODEL MACH NO PO(PSIA) TO(DEG R) ALPHA-MODEL ALPHA-SECTION ALPHA-PREBEND ROLL-MODEL YAW  
 9 1 MATED 7.96 123.6 1202 .05 .05 0 0 0  
 T-INF P-INF O-INF V-INF RHO-INF MU-INF RE/FT MREF STREF  
 IDEG R (PSIA) (PSIA) (FT/SEC) (SLUGS/FT<sup>3</sup>) (LB-SEC/FT<sup>2</sup>) (FT-LB) (R= .0175FT) (R= .0175FT)  
 87.9 .013 .581 3657 1.250E-05 7.079E-08 6.458E 05 1.847E-02 5.114E-02  
 CAMPFA ROLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHOXCAK) TRAR(TO) BETA(TO)  
 TOP(1) 8223 79 .0475 5.128E-02 4.7350E-02  
 UPPER SIDE(US) 7766  
 LOWER SIDE(LS) 7508  
 HOTTCM(B) 8234

PIC NO TIME DELTIME M(TO) MREF M(-970)/MREF M(-8570) M(-8570)/MREF S(TO) S(TO)  
 US 7913(113) 34.44 32.94 3.519E-04 4.831E-04 .0262 5.472E-04 .0296 1.078E-03  
 T 7978(113) 36.49 34.98 3.802E-04 4.689E-04 .0254 5.309E-04 .0287 1.041E-03  
 M 3726(113) 36.49 34.99 3.802E-04 4.689E-04 .0254 5.309E-04 .0287 1.041E-03  
 US 7916(113) 36.52 35.01 3.801E-04 4.687E-04 .0254 5.309E-04 .0287 1.044E-03  
 LS 7917(113) 36.52 35.01 3.801E-04 4.687E-04 .0254 5.309E-04 .0287 1.044E-03  
 T 7977(113) 36.59 37.09 3.693E-04 4.554E-04 .0247 5.157E-04 .0279 1.014E-03  
 M 3727(113) 36.59 37.09 3.693E-04 4.554E-04 .0247 5.157E-04 .0279 1.014E-03  
 LS 7911(113) 36.59 37.09 3.693E-04 4.554E-04 .0247 5.157E-04 .0279 1.014E-03  
 US 7915(113) 36.62 37.12 3.692E-04 4.553E-04 .0246 5.155E-04 .0279 1.013E-03  
 MODEL WAS LEFT CENTERLINE  
 T 7959(113) 40.67 35.17 3.544E-04 4.432E-04 .0240 5.018E-04 .0272 9.860E-04  
 M 3724(113) 40.67 35.17 3.544E-04 4.432E-04 .0240 5.018E-04 .0272 9.860E-04  
 LS 7912(113) 40.67 35.17 3.544E-04 4.432E-04 .0240 5.018E-04 .0272 9.860E-04  
 US 7918(113) 40.70 35.19 3.543E-04 4.430E-04 .0240 5.017E-04 .0271 9.857E-04

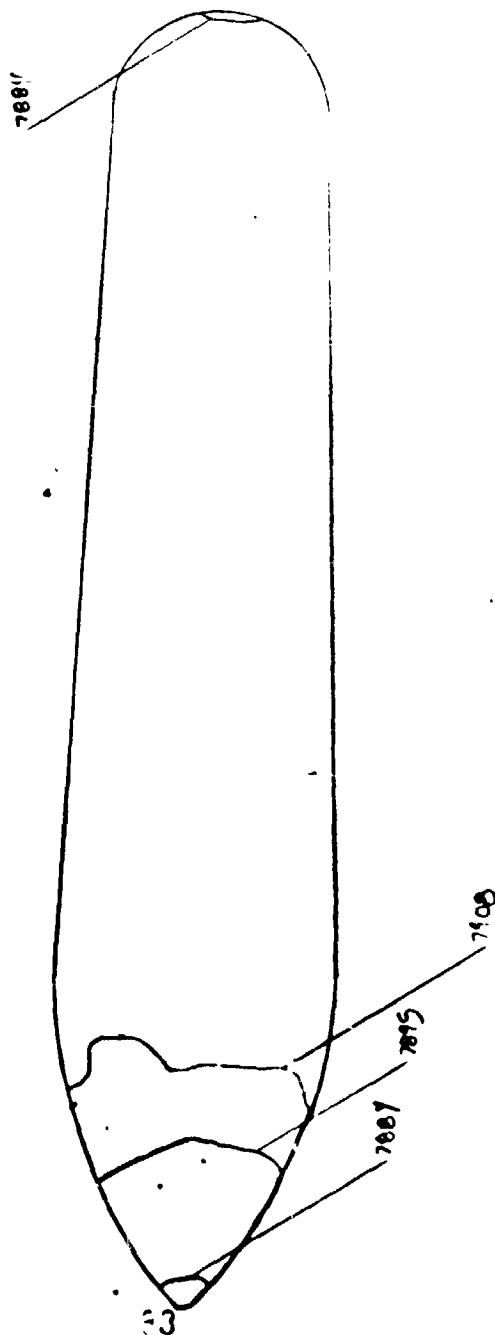
Group 10  
7908  
Lower Side  
MS



7766  
GP 10  
Upper Side

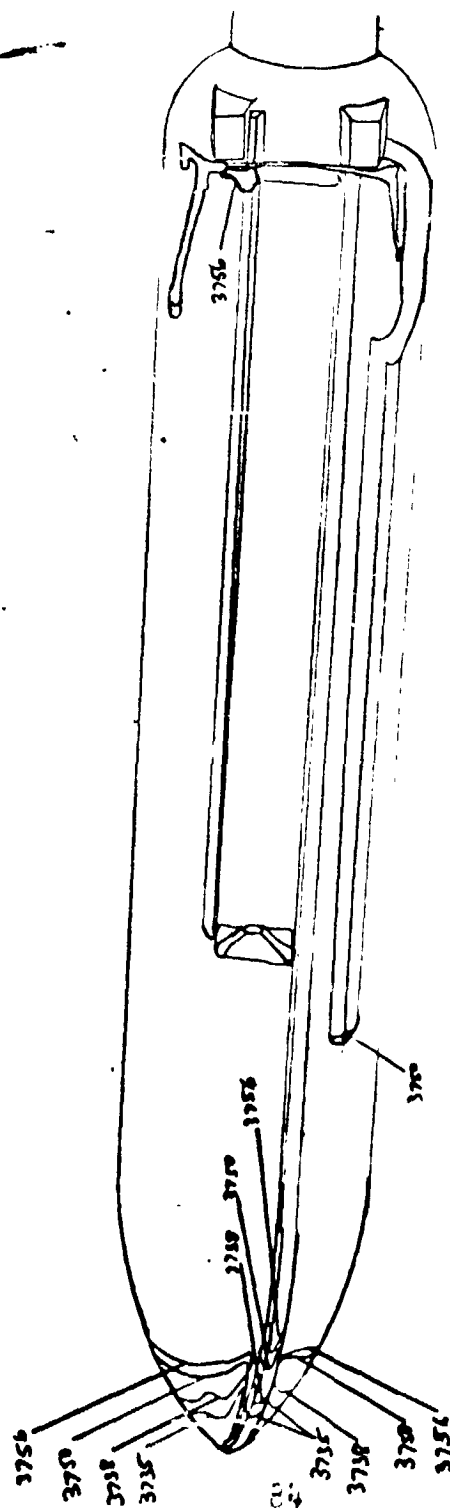


Group 10  
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8223  
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823A  
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6/29/73

NASA-R1 ORBITER HEATING

VA289

AEDC(ARO, INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL R

GROUP CONFIG MODEL MACH NO POI(PStA) TO(DEG R) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREBEND ROLL-MODEL YAW  
 10 8 7.96 122.6 1192 -.06 .06 0 180.00 -.00

STREF

MREF

RE/FT

(R=.0175FT) (R=.0175FT)

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CAWDA ROLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHOXCK) TRAR(TO) BETA(TO)

TOP(T) 823

UPPER SINE(US) 7766

LOWER SINE(LS) 7908

NOTCH(R) 8234

78

.0509

0

0

PTC NO TIME DELTIME M(TO) M(TO)/HREF M(.9TO) M(.85TO)/HREF ST(TO)

T 7681(175) 1.15 MODEL HAS NOT REACHED CENTERLINE

M 3729(175) 1.15 MODEL HAS NOT REACHED CENTERLINE

LS 1913(175) 1.15 MODEL HAS NOT REACHED CENTERLINE

US 7917(175) 1.18 MODEL HAS NOT REACHED CENTERLINE

T 7982(175) 2.23 MODEL HAS NOT REACHED CENTERLINE

M 3730(175) 2.23 MODEL HAS NOT REACHED CENTERLINE

US 7918(175) 2.25 MODEL HAS NOT REACHED CENTERLINE

LS 1914(175) 2.25 MODEL HAS NOT REACHED CENTERLINE

INJECT TIME = 2.68

T 7983(175) 3.20 1.88

M 3731(175) 3.20 1.88

US 7919(175) 3.33 1.83

LS 1915(175) 3.33 1.83

T 7984(175) 4.28 2.90

M 3732(175) 4.28 2.90

US 7920(175) 4.41 2.90

LS 1916(175) 4.41 2.90

T 7985(175) 5.46 3.95

M 3733(175) 5.46 3.95

US 7921(175) 5.48 3.90

LS 1917(175) 5.48 3.90

T 7986(175) 6.53 5.03

M 3734(175) 6.53 5.03

US 7922(175) 6.56 5.05

LS 1918(175) 6.56 5.05

T 7987(175) 7.61 6.11

M 3735(175) 7.61 6.11

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NASA-RI ORBITER HEATING AEDCIAR(JAC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL R  
 VA289

GROUP CONFIG MODEL MACH NO PO(PSIA) TO(IDEG R) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREBEND ROLL-MODEL YAW  
 17 8 TANK 7.96 122.8 1192 --.06 .06 0 180.00 --.00  
 T-IAF P-INF Q-INF V-INF MU-INF RE/FT MREF STREF  
 (DEG R) (PSIA) (PSIA) (FT/SEC) (SLUGS/FT<sup>3</sup>) (LR-SEC/FT<sup>2</sup>) (FT-1) (R=.0175FT) (R=.0175FT)  
 87.2 .013 .576 3642 1.250E-05 7.021E-08 6.483E 05 1.87E-02 5.110E-02  
 CAMERA ROLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHOXCK) TRAR(ITO) BETA(ITO)  
 TOP(IT) 8223  
 UPPER SIDE(US) 7766  
 LOWER SIDE(LS) 7508  
 BOTTOM(BR) 8234

PIC NO	TIME	DELTIME	H(ITO)	H(ITO)/HREF	H(.970)	H(.970)/HREF	H(.85TO)	H(.85TO)/HREF	ST(ITO)
US 7923(175)	7.63	6.13	3.064E-03	.168	3.865E-03	.2105	4.448E-03	.2422	8.429E-03
LS 1919(175)	7.63	6.13	3.064E-03	.168	3.865E-03	.2105	4.448E-03	.2422	8.429E-03
T 7948(175)	8.68	7.18	2.831E-03	.1541	3.572E-03	.1944	4.110E-03	.2237	7.781E-03
M 7734(175)	8.68	7.18	2.831E-03	.1541	3.572E-03	.1944	4.110E-03	.2237	7.781E-03
US 7424(175)	8.71	7.21	2.826E-03	.1538	3.565E-03	.1941	4.103E-03	.2233	7.768E-03
LS 1920(175)	8.71	7.21	2.826E-03	.1538	3.565E-03	.1941	4.103E-03	.2233	7.768E-03
T 7989(175)	9.76	8.26	2.640E-03	.1436	3.331E-03	.1912	3.833E-03	.2085	7.251E-03
M 7737(175)	9.76	8.26	2.640E-03	.1436	3.331E-03	.1912	3.833E-03	.2085	7.251E-03
US 7925(175)	9.79	8.29	2.636E-03	.1435	3.328E-03	.1911	3.827E-03	.2084	7.252E-03
LS 1921(175)	9.79	8.29	2.636E-03	.1435	3.328E-03	.1911	3.827E-03	.2084	7.252E-03
T 7990(175)	10.84	9.34	2.483E-03	.1353	3.133E-03	.1707	3.605E-03	.1964	6.836E-03
M 7734(175)	10.84	9.34	2.483E-03	.1353	3.133E-03	.1707	3.605E-03	.1964	6.836E-03
US 7926(175)	10.86	9.36	2.480E-03	.1350	3.129E-03	.1703	3.600E-03	.1959	6.817E-03
LS 1922(175)	10.86	9.36	2.480E-03	.1350	3.129E-03	.1703	3.600E-03	.1959	6.817E-03
T 7991(175)	11.91	10.41	2.351E-03	.1279	2.967E-03	.1614	3.414E-03	.1857	6.458E-03
M 7737(175)	11.91	10.41	2.351E-03	.1279	2.967E-03	.1614	3.414E-03	.1857	6.458E-03
US 7923(175)	11.91	10.41	2.351E-03	.1279	2.967E-03	.1614	3.414E-03	.1857	6.458E-03
LS 1923(175)	11.91	10.41	2.351E-03	.1279	2.967E-03	.1614	3.414E-03	.1857	6.458E-03
T 7992(175)	12.59	11.49	2.248E-03	.1218	2.824E-03	.1537	3.250E-03	.1769	6.153E-03
M 7740(175)	12.59	11.49	2.248E-03	.1218	2.824E-03	.1537	3.250E-03	.1769	6.153E-03
US 7924(175)	12.59	11.49	2.238E-03	.1216	2.821E-03	.1534	3.246E-03	.1765	6.137E-03
LS 1924(175)	12.59	11.49	2.238E-03	.1216	2.821E-03	.1534	3.246E-03	.1765	6.137E-03
T 7993(175)	13.07	12.56	2.140E-03	.1164	2.701E-03	.1469	3.107E-03	.1690	5.874E-03
M 7741(175)	13.07	12.56	2.140E-03	.1164	2.701E-03	.1469	3.107E-03	.1690	5.874E-03
US 7925(175)	13.07	12.56	2.140E-03	.1164	2.701E-03	.1469	3.107E-03	.1690	5.874E-03
LS 1925(175)	13.07	12.56	2.140E-03	.1164	2.701E-03	.1469	3.107E-03	.1690	5.874E-03

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6/29/73

NASA-RI ORBITER HEATING  
 VA289  
 AEDC(ARO,INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL R

GROUP	CONFIG	MODEL	TANK	MACH NO	PO(PSTIA)	TO(DEG R)	ALPHA-MODEL	ALPHA-SECTOR	ALPHA-PREBEND	ROLL-MODEL	YAW
10	R			7.96	123.1	1192	-0.06	.06	0	180.00	-0.00
1-JAF	P-INF	Q-INF	V-INF				RE/FT	MRFF	STREF		
(DEG R)	(PSTIA)	(FT/SEC)	(FT/SEC)				(FT-1)	(R= .0175FT)	(R= .0175FT)		
87.2	.013	.578	3642		1.253E-05	7.021E-08	6.499E 05	1.439E-02	5.104E-02		
CAMERA	ROLL NO	PAINT TEMP (DEG F)	INITIAL TEMP (DEG F)	SQUARE ROOT (RHOXCAK)	TRAR(TO)	BETAI(TO)					
TOP(T)	8223		78	.0509	1.482E-01	1.4903E-01					
UPPER SIDE(US)	7766										
LOWER SIDE(LS)	7908										
BOTTOM(B)	8234										

PTC NO	TIME DELTIME	H(TO)	H(TO)/HREF	M(.9TO)	M(.9TO)/MRFF	M(.85TO)	M(.85TO)/HREF	ST(TO)
US 7920(175)	14.09	2.138E-03	.1163	2.698E-03	.1468	3.104E-03	.1689	5.873E-03
M 3742(175)	15.12	2.056E-03	.1118	2.594E-03	.1411	2.985E-03	.1623	5.643E-03
T 7894(175)	15.14	2.054E-03	.1118	2.592E-03	.1410	2.982E-03	.1623	5.642E-03
US 7930(175)	15.14	2.054E-03	.1118	2.592E-03	.1410	2.982E-03	.1623	5.642E-03
LS 1926(175)	15.14	2.054E-03	.1118	2.592E-03	.1410	2.982E-03	.1623	5.642E-03
T 7895(175)	16.19	1.979E-03	.1076	2.497E-03	.1358	2.874E-03	.1563	5.432E-03
M 3743(175)	16.19	1.979E-03	.1076	2.497E-03	.1358	2.874E-03	.1563	5.432E-03
US 7931(175)	16.22	1.977E-03	.1075	2.495E-03	.1357	2.871E-03	.1561	5.427E-03
LS 1927(175)	16.22	1.977E-03	.1075	2.495E-03	.1357	2.871E-03	.1561	5.427E-03
M 3744(175)	17.27	1.910E-03	.1039	2.411E-03	.1311	2.774E-03	.1509	5.243E-03
T 7896(175)	17.29	1.909E-03	.1038	2.409E-03	.1310	2.772E-03	.1507	5.239E-03
US 7932(175)	17.29	1.909E-03	.1038	2.409E-03	.1310	2.772E-03	.1507	5.239E-03
LS 1924(175)	17.29	1.909E-03	.1038	2.409E-03	.1310	2.772E-03	.1507	5.239E-03
M 3745(175)	18.35	1.848E-03	.1005	2.332E-03	.1268	2.684E-03	.1459	5.069E-03
T 7897(175)	18.37	1.847E-03	.1005	2.331E-03	.1268	2.682E-03	.1459	5.073E-03
US 7933(175)	18.37	1.847E-03	.1005	2.331E-03	.1268	2.682E-03	.1459	5.073E-03
LS 1929(175)	18.37	1.847E-03	.1005	2.331E-03	.1268	2.682E-03	.1459	5.073E-03
T 7898(175)	19.42	1.792E-03	.0975	2.261E-03	.1230	2.602E-03	.1415	4.918E-03
M 3746(175)	19.42	1.791E-03	.0973	2.260E-03	.1228	2.600E-03	.1413	4.911E-03
US 7934(175)	19.45	1.791E-03	.0973	2.260E-03	.1228	2.600E-03	.1413	4.911E-03
LS 1930(175)	19.45	1.791E-03	.0973	2.260E-03	.1228	2.600E-03	.1413	4.911E-03
T 7899(175)	20.50	1.740E-03	.0946	2.196E-03	.1194	2.527E-03	.1374	4.773E-03
M 3747(175)	20.50	1.740E-03	.0946	2.196E-03	.1194	2.527E-03	.1374	4.773E-03
US 7935(175)	20.52	1.739E-03	.0946	2.195E-03	.1194	2.525E-03	.1374	4.778E-03
LS 1931(175)	20.52	1.739E-03	.0946	2.195E-03	.1194	2.525E-03	.1374	4.778E-03

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6/29/73

## NASA-RI ORBITER HEATING

VA289

AEDC(ARD, INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL R

GROUP	CONFIG	MODEL	MACH NO	PO(PSTIA)	TO( DEG R)	ALPHA-MODEL	ALPHA-SECTOR	ALPHA-PREREND	ROLL-MODEL	YAW
10	A	TANK	7.96	123.0	1192	-0.06	0.06	0	180.00	-0.00
T-INF	P-INF	O-INF	V-INF	RHO-INF	MU-INF	RF/FT	HRFF	STREF		
(DEG R)	(PSTIA)	(FT/SFC)	(FT/SEC)	(SLUGS/FT <sup>3</sup> )	(LR-SEC/FT <sup>2</sup> )	(FT-1)	(R= .0175FT)	(R= .0175FT)		
87.2	.013	.577	3642	1.252E-05	7.021E-08	6.494E 05	1.939E-02	5.108E-02		
CAMERA	ROLL NO	PAINT TEMP (DEG F)	INITIAL TEMP (DEG F)	SQUARE ROOT (RHOXCK)	TRAR(10)	BETA(10)				
TOP(1)	8223		78							
UPPER SIDE(US)	7766	175		.0509	1.492E-01	1.4903E-01				
LOWER SIDE(LS)	7504									
MOTTCMIR)	8234									

PIC NO	TIME DELTIME	H(10)	H(10)/HREF	H(.910)	H(.910)/HREF	H(.8510)	H(.8510)/HREF	ST(10)
T 7300(175)	21.57	1.693E-03	.0921	2.137E-03	.1162	2.458E-03	.1337	4.647E-03
M 7340(175)	21.57	1.693E-03	.0921	2.137E-03	.1162	2.458E-03	.1337	4.647E-03
US 7936(175)	21.60	1.692E-03	.0920	2.135E-03	.1161	2.457E-03	.1336	4.641E-03
LS 1932(175)	21.60	1.692E-03	.0920	2.135E-03	.1161	2.457E-03	.1336	4.641E-03
T 7501(175)	21.57	1.533E-03	.0888	2.061E-03	.1121	2.371E-03	.1290	4.483E-03
M 7349(175)	21.57	1.533E-03	.0888	2.061E-03	.1121	2.371E-03	.1290	4.483E-03
LS 1931(175)	21.57	1.533E-03	.0888	2.061E-03	.1121	2.371E-03	.1290	4.483E-03
US 7517(175)	21.60	1.632E-03	.0947	2.064E-03	.1170	2.370E-03	.1288	4.476E-03
M 7375(175)	21.65	1.540E-03	.0947	1.967E-03	.1069	2.264E-03	.1230	4.272E-03
LS 1930(175)	21.60	1.559E-03	.0947	1.967E-03	.1069	2.264E-03	.1230	4.272E-03
T 7503(175)	21.58	1.465E-03	.0912	1.896E-03	.1025	2.170E-03	.1179	4.096E-03
M 7351(175)	21.26	1.455E-03	.0912	1.896E-03	.1025	2.170E-03	.1179	4.096E-03
LS 1935(175)	21.26	1.455E-03	.0912	1.896E-03	.1025	2.170E-03	.1179	4.096E-03
US 7533(175)	21.28	1.434E-03	.0912	1.814E-03	.1024	2.169E-03	.1178	4.091E-03
M 7352(175)	21.33	1.434E-03	.0912	1.814E-03	.1024	2.169E-03	.1178	4.091E-03
LS 1936(175)	21.33	1.434E-03	.0912	1.814E-03	.1024	2.169E-03	.1178	4.091E-03
US 7940(175)	21.50	1.347E-03	.0753	1.750E-03	.0950	2.087E-03	.1093	3.796E-03
T 7505(175)	31.44	1.347E-03	.0753	1.750E-03	.0950	2.087E-03	.1093	3.796E-03
M 7353(175)	31.44	1.347E-03	.0753	1.750E-03	.0950	2.087E-03	.1093	3.796E-03
LS 1937(175)	31.44	1.347E-03	.0753	1.750E-03	.0950	2.087E-03	.1093	3.796E-03
US 7941(175)	31.46	1.346E-03	.0729	1.692E-03	.0919	1.947E-03	.1058	3.674E-03
T 7906(175)	31.51	1.341E-03	.0729	1.692E-03	.0919	1.947E-03	.1058	3.674E-03
M 7354(175)	31.51	1.341E-03	.0729	1.692E-03	.0919	1.947E-03	.1058	3.674E-03
LS 1938(175)	31.51	1.341E-03	.0729	1.692E-03	.0919	1.947E-03	.1058	3.674E-03

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 6/29/73

AEDC(ARO-INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL B

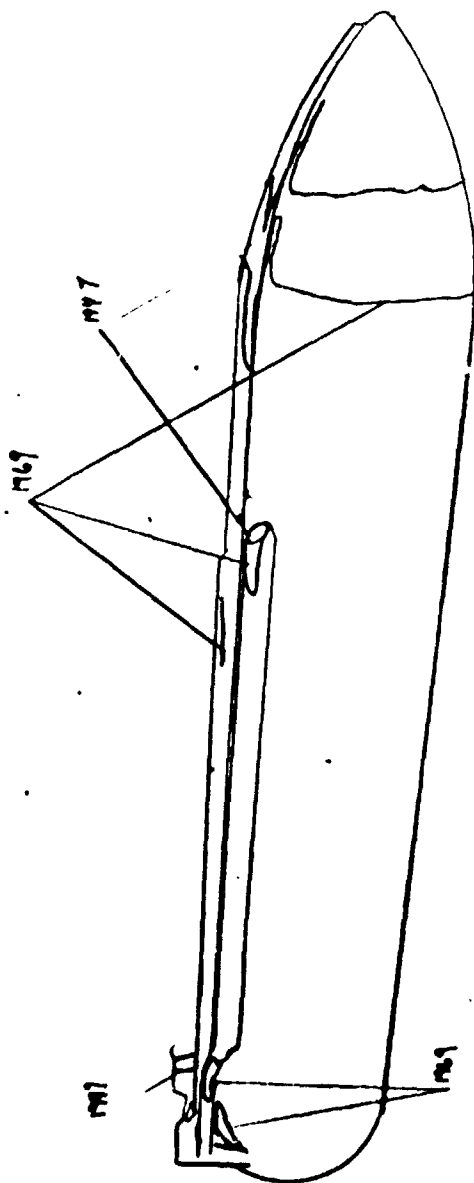
NASA-RI ORBITER HEATING

VA289

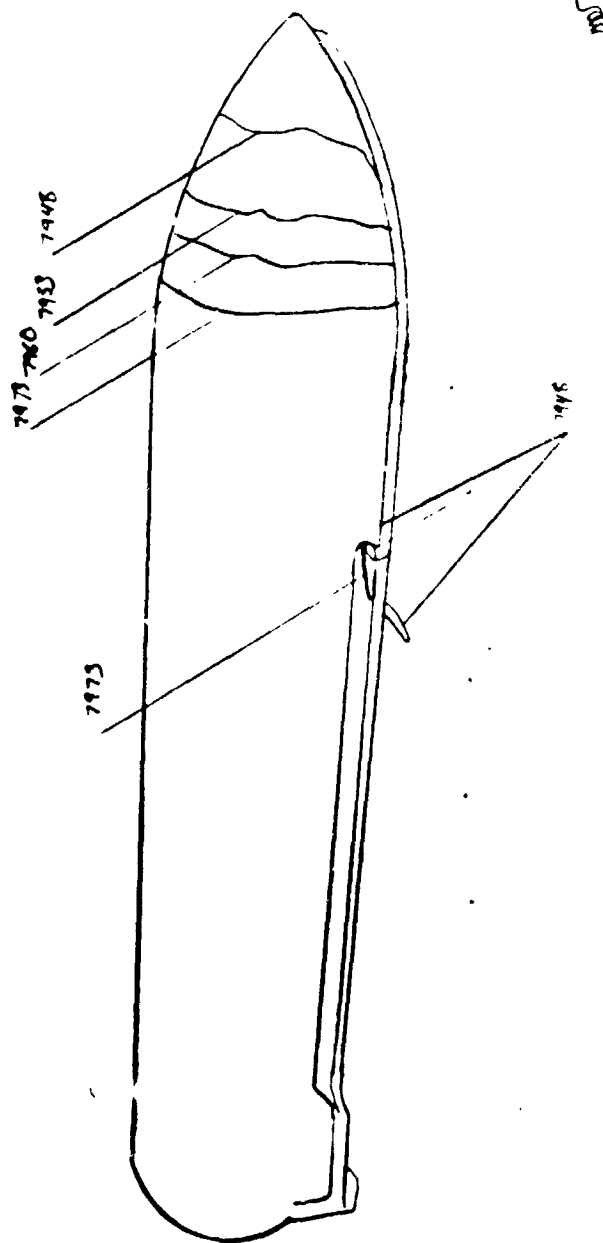
GROUP CONFIG MODEL MACH NO PO(P/SIA) TO( DEG R) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREBEND ROLL-MODEL YAW  
 10 7.96 123.3 1192 -.06 .06 0 180.00 -.00  
 T-1AF P-INF Q-INF V-INF RHO-INF MU-INF RE/FT MREF STREF  
 (DEG R) (PSIA) (FT/SEC) (SLUGS/FT3) (LB-SEC/FT2) (FT-1) (R= .0175FT) (R= .0175FT)  
 87.2 .013 .578 3642 1.255E-05 7.021E-08 6.509E 05 1.840E-02 5.100E-02  
 CAMERA ROLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHOCCK) TBAR(10) BETAITO)  
 TOP(T) 8223  
 UPPER SIDE(US) 7766  
 LOWER SIDE(LS) 7608  
 BOTTOM(B) 8234

PIC NO TIME DELTIME M(TO)/MREF M(.9TO) M(.8TO) M(.85TO)/MREF ST(10)  
 US 7942(175) 33.54 32.84 1.340E-03 1.491E-03 .0919 1.946E-03 .1057 3.572E-03  
 T 7907(175) 35.29 33.79 1.305E-03 1.447E-03 .0895 1.895E-03 .1030 3.575E-03  
 M 7755(175) 35.29 33.79 1.305E-03 1.647E-03 .0895 1.895E-03 .1030 3.575E-03  
 LS 1939(175) 35.29 33.79 1.305E-03 1.647E-03 .0895 1.895E-03 .1030 3.575E-03  
 US 7943(175) 35.32 33.81 1.305E-03 1.446E-03 .0894 1.894E-03 .1029 3.572E-03  
 T 7908(175) 37.32 35.81 1.268E-03 1.599E-03 .0868 1.846E-03 .0999 3.468E-03  
 M 7756(175) 37.32 35.81 1.268E-03 1.599E-03 .0868 1.846E-03 .0999 3.468E-03  
 LS 1940(175) 37.32 35.81 1.268E-03 1.599E-03 .0868 1.846E-03 .0999 3.468E-03  
 US 7944(175) 37.34 35.84 1.267E-03 1.599E-03 .0869 1.846E-03 .1000 3.472E-03  
 MODEL WAS LEFT CENTERLINE  
 T 7904(175) 39.40 37.89 1.232E-03 1.555E-03 .0869 1.789E-03 .0972 3.374E-03  
 M 7757(175) 39.40 37.89 1.232E-03 1.555E-03 .0869 1.789E-03 .0972 3.374E-03  
 LS 1941(175) 39.40 37.89 1.232E-03 1.555E-03 .0869 1.789E-03 .0972 3.374E-03  
 US 7945(175) 39.42 37.92 1.232E-03 1.554E-03 .0869 1.789E-03 .0971 3.370E-03

Group 11  
7908  
Lower Side  
✓



7766  
11 29  
9726

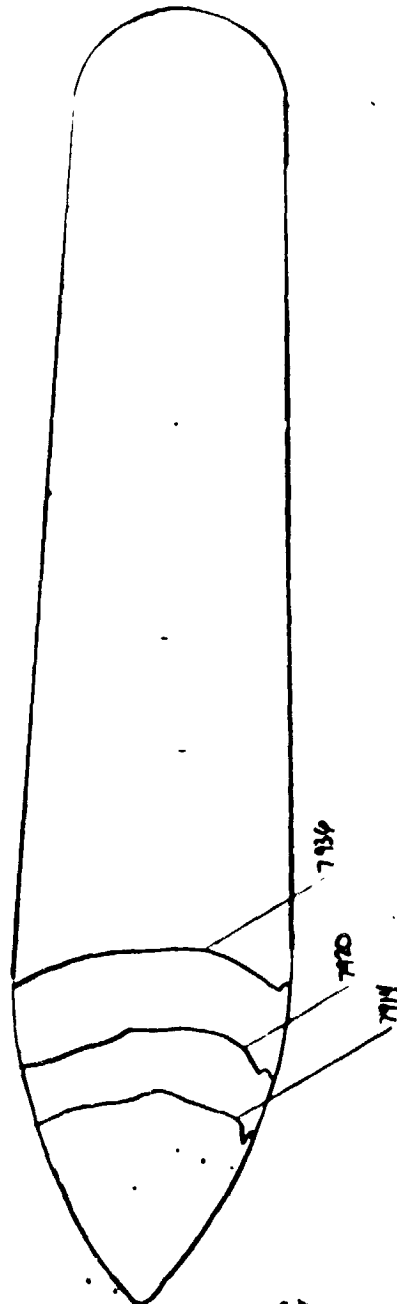


51



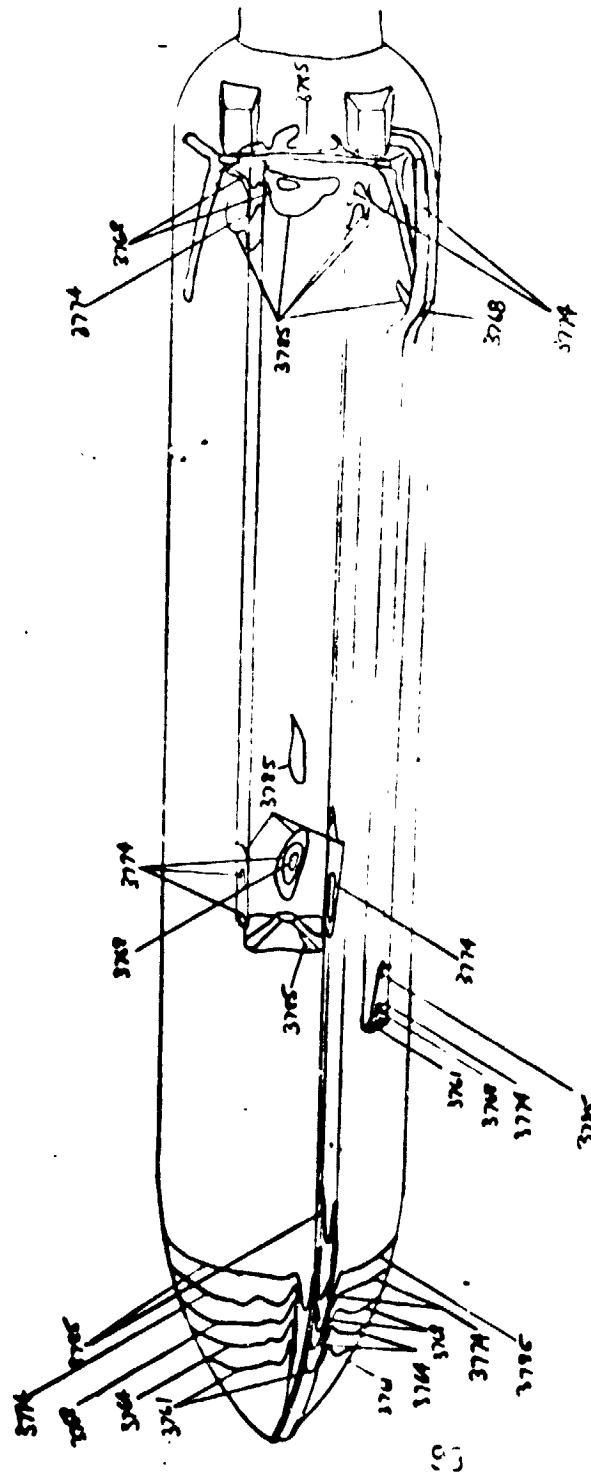
REPRODUCIBILITY OF THE ORIGINAL PAGE IS POOR.

Comp II  
8273  
T.C. ✓



REPRODUCIBILITY OF THE ORIGINAL PAGE IS POOR.

8234  
GP 11  
Bottom



OWC

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6/29/73

NASA-BI WRITER KEYLINE

AEDC(ARJ, IAC) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL B

VA209

GROUP	CONFIG	MODEL	MACH NO	POI(PSIA)	TOI(EG R)	ALPHA-MODEL	ALPHA-SECTOR	ALPHA-PREHEND	ROLL-MODEL	YAW
1)		TANK	7.96	127.8	1192	-0.06	.06	0	180.00	-0.00
T-1NF	P-1NF	Q-1NF	V-1NF	RND-1NF	MU-1NF	HE/FT	MREF	STREF		
(OFG R)	(PSIA)	(FT/SFC)	(SLUGS/FT3)	(LBS-SEC/FT2)	(FT-1)	(R= .0175FT)	(R= .0175FT)			
87.2	.413	.516	.642	1.250E-05	7.02E-09	6.49E 05	1.876E-02	5.109E-02		
CAMERA	ROLL NO	PAINT TEMP (DEG F)	INITIAL TEMP (DEG F)	SQUARE ROOT (RHOACAR)	TBAR(10)	BETA(10)				
TOP(1)	8223		79	.0475	0	0				
UPPER SHOE(US)	7766									
LOWER SHOE(LS)	7608									
MOTCH(10)	8234									

PIC NO	TIME DELTIME	M(10)	M(10)/MREF	M(1.010)	M(1.010)/MREF	M(1.8510)	M(1.8510)/MREF	ST(10)
T 7910(113)	1-15	1.703E-03	.0924	2.104E-03	.1144	2.383E-03	.1296	4.689E-03
M 7954(113)	1-15	1.703E-03	.0924	2.104E-03	.1144	2.383E-03	.1296	4.689E-03
LS 1942(113)	1-15	1.691E-03	.0920	2.094E-03	.1137	2.367E-03	.1288	4.664E-03
US 7946(113)	1-15	1.691E-03	.0920	2.094E-03	.1137	2.367E-03	.1288	4.664E-03
T 7911(113)	1-18	1.347E-03	.0733	1.644E-03	.0906	1.845E-03	.1026	3.715E-03
M 7959(113)	2-23	1.347E-03	.0733	1.644E-03	.0906	1.845E-03	.1026	3.715E-03
US 7947(113)	2-25	1.347E-03	.0729	1.657E-03	.0901	1.877E-03	.1021	3.693E-03
LS 1943(113)	2-25	1.347E-03	.0729	1.657E-03	.0901	1.877E-03	.1021	3.693E-03
INJECT TIM. = 2.69								
T 7912(113)	3-20	1.409E-03	.0625	1.420E-03	.0772	1.608E-03	.0875	3.164E-03
M 7961(113)	3-20	1.409E-03	.0625	1.420E-03	.0772	1.608E-03	.0875	3.164E-03
US 7950(113)	3-23	1.409E-03	.0623	1.415E-03	.0770	1.603E-03	.0873	3.159E-03
LS 1944(113)	3-23	1.409E-03	.0623	1.415E-03	.0770	1.603E-03	.0873	3.159E-03
T 7913(113)	4-28	1.019E-03	.0554	1.259E-03	.0685	1.426E-03	.0776	2.810E-03
M 7962(113)	4-28	1.019E-03	.0554	1.259E-03	.0685	1.426E-03	.0776	2.810E-03
US 7951(113)	6-23	1.019E-03	.0553	1.256E-03	.0683	1.422E-03	.0774	2.798E-03
LS 1945(113)	6-23	1.019E-03	.0553	1.256E-03	.0683	1.422E-03	.0774	2.798E-03
T 7914(113)	7-21	9.245E-04	.0503	1.142E-03	.0621	1.294E-03	.0704	2.544E-03
M 7963(113)	7-21	9.245E-04	.0503	1.142E-03	.0621	1.294E-03	.0704	2.544E-03
US 7952(113)	7-21	9.245E-04	.0503	1.142E-03	.0621	1.294E-03	.0704	2.544E-03
LS 1946(113)	7-21	9.245E-04	.0503	1.142E-03	.0621	1.294E-03	.0704	2.544E-03

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6/29/73

## NASA-RI ORBITER HEATING

AEDC(ARO, INC.) ARNOLD AFS, TENNESSEE

VON KARMAN GAS DYNAMICS FACILITY

50 INCH HYPERSONIC TUNNEL R

VA289

GROUP	CONFIG	MODEL	TANK	MACH NO	PO(P51A)	TO(IDEG R)	ALPHA-MODEL	ALPHA-SECTOR	ALPHA-PREBEND	ROLL-MODEL	YAW
11	R			7.96	123.2	1192	-.06	.06	0	180.00	-.00

T-INF	P-INF	Q-INF	V-INF	RNO-INF	SLUGS/FT3	FT/SEC	SLUGS/FT2	RF/FT	MREF	STREF	R=
87.2	.013	.578	36.2	1.254E-05	7.021E-08	6.505E 05	1.839E-02	5.101E-02			

CAMERA	ROLL NO	PAINT TEMP (DEG F)	INITIAL TEMP (DEG F)	SQUARE ROOT (RHOCXK)	THAR(TO)	BETA(TO)
TOP(T)	8223		79	.0475	5.205E-02	4.8094E-02
UPPER SIDE(US)	7766	113				
LOWER SIDE(LS)	7908					
BOTTOM(B)	8234					

PTC NO	TIME DELTIME	M(TO)	M(TO)/MREF	M(.9TO)	M(.9TO)/MREF	M(.85TO)	M(.85TO)/MREF	ST(TO)
US 7952(113)	7.63	9.227E-04	.0502	1.140E-03	.0620	1.292E-03	.0703	2.543E-03
T 7917(113)	8.68	8.525E-04	.0464	1.053E-03	.0573	1.193E-03	.0649	2.348E-03
M 3765(113)	8.68	8.525E-04	.0464	1.053E-03	.0573	1.193E-03	.0649	2.348E-03
LS 1949(113)	8.68	8.525E-04	.0464	1.053E-03	.0573	1.193E-03	.0649	2.348E-03
US 7953(113)	8.71	8.510E-04	.0463	1.051E-03	.0572	1.191E-03	.0648	2.342E-03
T 7914(113)	9.76	7.950E-04	.0432	9.822E-04	.0534	1.113E-03	.0605	2.187E-03
M 3766(113)	9.76	7.950E-04	.0432	9.822E-04	.0534	1.113E-03	.0605	2.187E-03
LS 1950(113)	9.76	7.950E-04	.0432	9.822E-04	.0534	1.113E-03	.0605	2.187E-03
US 7954(113)	9.79	7.938E-04	.0432	9.808E-04	.0533	1.111E-03	.0604	2.186E-03
T 7919(113)	10.84	7.477E-04	.0406	9.239E-04	.0502	1.047E-03	.0569	2.056E-03
M 3767(113)	10.84	7.477E-04	.0406	9.239E-04	.0502	1.047E-03	.0569	2.056E-03
LS 1951(113)	10.84	7.477E-04	.0406	9.239E-04	.0502	1.047E-03	.0569	2.056E-03
US 7.55(113)	10.86	7.467E-04	.0406	9.226E-04	.0502	1.045E-03	.0568	2.055E-03
T 7920(113)	11.91	7.040E-04	.0385	8.748E-04	.0476	9.911E-04	.0539	1.948E-03
M 3768(113)	11.91	7.040E-04	.0385	8.748E-04	.0476	9.911E-04	.0539	1.948E-03
LS 1952(113)	11.91	7.040E-04	.0385	8.748E-04	.0476	9.911E-04	.0539	1.948E-03
US 7956(113)	11.94	7.022E-04	.0384	8.738E-04	.0475	9.899E-04	.0538	1.946E-03
T 7921(113)	12.59	6.740E-04	.0366	8.328E-04	.0453	9.435E-04	.0513	1.853E-03
M 3769(113)	12.59	6.740E-04	.0366	8.328E-04	.0453	9.435E-04	.0513	1.853E-03
LS 1953(113)	12.59	6.740E-04	.0366	8.328E-04	.0453	9.435E-04	.0513	1.853E-03
US 7957(113)	13.01	6.733E-04	.0366	8.319E-04	.0452	9.425E-04	.0512	1.853E-03
T 7922(113)	14.07	6.445E-04	.0359	7.964E-04	.0433	9.022E-04	.0490	1.772E-03
M 3770(113)	14.07	6.445E-04	.0359	7.964E-04	.0433	9.022E-04	.0490	1.772E-03
LS 1954(113)	14.07	6.445E-04	.0359	7.964E-04	.0433	9.022E-04	.0490	1.772E-03
US 7958(113)	14.09	6.439E-04	.0359	7.956E-04	.0432	9.013E-04	.0490	1.769E-03

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6/29/73

AEDC(ARO-INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL R

NASA-RI ORBITER HEATING

VA249

GROUP CONFIG MODEL MACH NO PROPSIA TO (DEG R) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREBEND ROLL-MODEL YAW

11 2 123.4 7.96 1192 -0.06 0.06 0 180.00 -0.00

T-INF P-INF Q-INF V-INF MU-INF RHO-INF RE/FT MREF STREF

(DEG R) (PSIA) (PSIA) (FT/SFC) (SLUGS/FT<sup>3</sup>) (LR-SEC/FT<sup>2</sup>) (FI-1) (R= .0175FT) (R= .0175FT)

87.2 .013 .579 36.2 1.256E-05 7.021E-08 6.515E 05 1.841E-02 5.097E-02

CAMERA ROLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RMGXCKX) TRAR(TO) BETA(TO)

TOP(1) 8223 79 .0475 5.205E-02 4.8094E-02

UPPER SURF(US) 7766

LOWER SURF(LS) 7509

MIDTCH(M) 8234

PTC NO	TIME DELTIME	H(TO)	H(TO)/MREF	H(-9TO)	H(-9TO)/MREF	H(-85TO)	H(-85TO)/MREF	ST(TO)
T 7923(113)	15.14	6.186E-04	.0336	7.643E-04	.0415	8.659E-04	.0470	1.699E-03
R 3771(113)	15.14	6.186E-04	.0336	7.643E-04	.0415	8.659E-04	.0470	1.699E-03
LS 1955(113)	15.14	6.186E-04	.0336	7.643E-04	.0415	8.659E-04	.0470	1.699E-03
US 7959(113)	15.17	6.186E-04	.0336	7.643E-04	.0415	8.659E-04	.0470	1.699E-03
T 7924(113)	16.22	5.955E-04	.0324	7.358E-04	.0400	8.336E-04	.0453	1.637E-03
M 3772(113)	16.22	5.955E-04	.0324	7.358E-04	.0400	8.336E-04	.0453	1.637E-03
LS 1956(113)	16.22	5.955E-04	.0324	7.358E-04	.0400	8.336E-04	.0453	1.637E-03
US 7960(113)	16.24	5.955E-04	.0323	7.352E-04	.0399	8.329E-04	.0452	1.635E-03
T 2511(13)	17.29	5.749E-04	.0312	7.103E-04	.0386	8.047E-04	.0437	1.579E-03
M 3773(113)	17.29	5.749E-04	.0312	7.103E-04	.0386	8.047E-04	.0437	1.579E-03
LS 1957(113)	17.29	5.749E-04	.0312	7.103E-04	.0386	8.047E-04	.0437	1.579E-03
US 7961(113)	17.32	5.744E-04	.0312	7.097E-04	.0386	8.040E-04	.0437	1.578E-03
T 7926(113)	18.37	5.562E-04	.0302	6.973E-04	.0373	7.786E-04	.0423	1.527E-03
M 3774(113)	18.37	5.562E-04	.0302	6.973E-04	.0373	7.786E-04	.0423	1.527E-03
LS 1958(113)	18.37	5.562E-04	.0302	6.973E-04	.0373	7.786E-04	.0423	1.527E-03
US 7962(113)	18.40	5.558E-04	.0293	6.963E-04	.0362	7.780E-04	.0410	1.527E-03
T 7927(113)	19.45	5.343E-04	.0293	6.663E-04	.0362	7.549E-04	.0410	1.481E-03
M 3775(113)	19.45	5.343E-04	.0293	6.663E-04	.0362	7.549E-04	.0410	1.481E-03
LS 1959(113)	19.45	5.343E-04	.0293	6.663E-04	.0362	7.549E-04	.0410	1.481E-03
US 7963(113)	19.47	5.238E-04	.0293	6.659E-04	.0362	7.544E-04	.0410	1.481E-03
T 7928(113)	20.52	5.238E-04	.0294	6.472E-04	.0351	7.332E-04	.0398	1.438E-03
M 3776(113)	20.52	5.238E-04	.0294	6.472E-04	.0351	7.332E-04	.0398	1.438E-03
LS 1960(113)	20.52	5.238E-04	.0294	6.472E-04	.0351	7.332E-04	.0398	1.438E-03
US 7964(113)	20.55	5.235E-04	.0294	6.468E-04	.0351	7.327E-04	.0398	1.438E-03
T 7929(113)	21.60	5.046E-04	.0277	6.296E-04	.0342	7.133E-04	.0387	1.399E-03
M 3777(113)	21.60	5.046E-04	.0277	6.296E-04	.0342	7.133E-04	.0387	1.399E-03
LS 1961(113)	21.60	5.046E-04	.0277	6.296E-04	.0342	7.133E-04	.0387	1.399E-03

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6/29/73

NASA-RI ORBITER HEATING  
 VA289  
 AEDC(ARO, INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL

GROUP	CONFIS	MODEL	MACH NO	PO(PSTIA)	TO(DEG R)	ALPHA-MODEL	ALPHA-SECTOR	ALPHA-PREBEND	ROLL-MODEL	YAW
11	A	TANK	7.96	123.5	1192	-0.06	.06	0	180.00	-0.00
T-1AF	P-1NF	Q-1NF	V-1NF	RHO-1NF	MU-1NF	RF/FT	HREF	STREF		
(DEG R)	(PSTIA)	(FT/SFC)	(FT/SFC)	(SLUGS/FT3)	(LR-SEC/FT2)	(FT-1)	(R= .0175FT)	(R= .0175FT)		
87.2	.313	.579	36.2	1.257E-05	7.020E-08	6.22E 05	1.842E-02	5.095E-02		
CAMERA	ROLL NO	PAINT TEMP (DEG F)	INITIAL TEMP (DEG F)	SQUARE ROOT (RHOXCKX)	IRAR(10)	BETA(10)				
TOP(T)	8223		79	.0475	5.205E-02	4.8094E-02				
UPPER SIDE(US)	7766	113								
LOWER SIDE(LS)	7508									
MUTCH(18)	8234									

PTC NO	TIME DELTIME	H(10)	H(10)/HREF	H(10T)	H(10T)/HREF	H(.85T)	H(.85T)/HREF	ST(10)
US 7965(113)	21.62	5.093E-04	.0276	6.292E-04	.0342	7.129E-04	.0387	1.397E-03
T 7930(113)	22.68	4.965E-04	.0269	6.134E-04	.0333	6.949E-04	.0377	1.361E-03
M 7778(113)	22.68	4.965E-04	.0269	6.134E-04	.0333	6.949E-04	.0377	1.361E-03
US 7966(113)	21.17	4.965E-04	.0271	6.131E-04	.0333	6.945E-04	.0377	1.363E-03
LS 1982(113)	21.20	4.962E-04	.0270	6.131E-04	.0333	6.945E-04	.0377	1.363E-03
T 7931(113)	22.70	4.962E-04	.0270	6.131E-04	.0333	6.945E-04	.0377	1.363E-03
US 7779(113)	22.75	4.962E-04	.0263	5.984E-04	.0325	6.779E-04	.0368	1.329E-03
M 7779(113)	23.75	4.843E-04	.0263	5.984E-04	.0325	6.779E-04	.0368	1.329E-03
US 7957(113)	23.78	4.840E-04	.0263	5.981E-04	.0325	6.775E-04	.0368	1.328E-03
LS 1983(113)	23.78	4.840E-04	.0263	5.981E-04	.0325	6.775E-04	.0368	1.328E-03
T 7932(113)	25.03	4.710E-04	.0256	5.819E-04	.0316	6.593E-04	.0358	1.294E-03
M 7780(113)	25.03	4.710E-04	.0256	5.819E-04	.0316	6.593E-04	.0358	1.294E-03
US 7964(113)	25.05	4.707E-04	.0256	5.816E-04	.0316	6.589E-04	.0358	1.292E-03
LS 1984(113)	25.05	4.707E-04	.0256	5.816E-04	.0316	6.589E-04	.0358	1.292E-03
T 7933(113)	27.11	4.515E-04	.0245	5.578E-04	.0303	6.326E-04	.0343	1.237E-03
M 7781(113)	27.11	4.515E-04	.0245	5.578E-04	.0303	6.326E-04	.0343	1.237E-03
US 7965(113)	27.11	4.515E-04	.0245	5.578E-04	.0303	6.326E-04	.0343	1.237E-03
LS 1985(113)	27.11	4.515E-04	.0245	5.578E-04	.0303	6.326E-04	.0343	1.237E-03
T 7934(113)	29.18	4.342E-04	.0236	5.365E-04	.0291	6.078E-04	.0330	1.191E-03
M 7782(113)	29.18	4.342E-04	.0236	5.365E-04	.0291	6.078E-04	.0330	1.191E-03
US 7966(113)	29.18	4.342E-04	.0236	5.365E-04	.0291	6.078E-04	.0330	1.191E-03
LS 1986(113)	29.21	4.342E-04	.0235	5.363E-04	.0291	6.075E-04	.0330	1.189E-03
T 7935(113)	31.26	4.188E-04	.0227	5.174E-04	.0281	5.862E-04	.0318	1.148E-03
M 7783(113)	31.26	4.188E-04	.0227	5.174E-04	.0281	5.862E-04	.0318	1.148E-03
US 7967(113)	31.26	4.188E-04	.0227	5.174E-04	.0281	5.862E-04	.0318	1.148E-03
LS 1987(113)	31.29	4.186E-04	.0227	5.172E-04	.0281	5.858E-04	.0318	1.148E-03

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6/29/73

NASA-PI ORBITER PEATING

VA289

AEDC(ARO, INC.) ARNOLD AFS, TENNESSEE  
VON KARMAN GAS DYNAMICS FACILITY  
50 INCH HYPERSONIC TUNNEL R

GROUP COMFTG MODEL MACH NO PO(PSTIA) TO(IDE R) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREBEND ROLL-MODEL YAW  
11 11 7.96 123.6 1192 -.06 .06 0 180.00 -.00

T-INF P-INF Q-INF V-INF RHQ-INF MU-INF RE/FT HREF STREF  
IDFG R1 (PSTIA) (FT/SFC) (SLUGS/FT3) (LH-SEC/FT2) (FT-1) (R=.0175FT) (R=.0175FT)

87.2 .013 .580 3.42 1.258E-05 7.020E-08 6.527E 05 1.842E-02 5.093E-02

CAMERA ROLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHQXCK) TRAR(TO) BETA(TO)

TOP(T) 8223 79 .0475 5.205E-02 4.8094E-02

UPPER SIDE(US) 7766

LOWER SIDE(LS) 7508

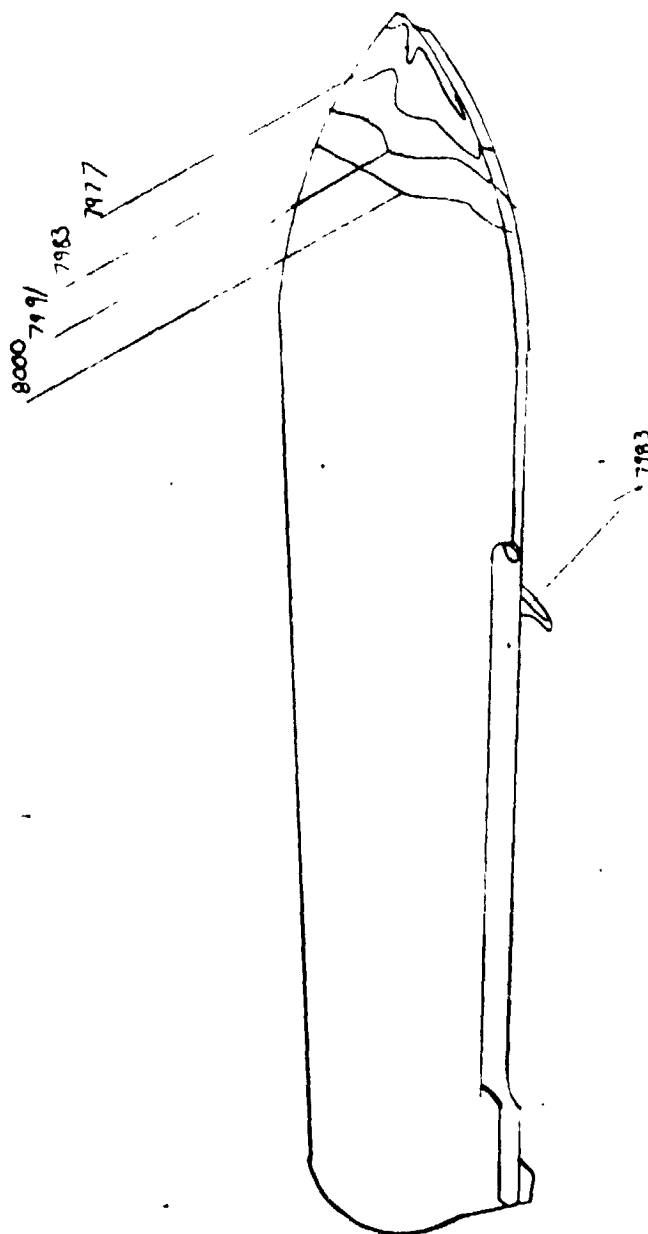
HOTCH(18) 8234

PTC NO	TIME DELTIME	H(TO)	H(TO)/HREF	H(.9TO)	H(.9TO)/HREF	H(.85TO)	H(.85TO)/HREF	ST(TO)
H 3784(113)	33.34	31.83	.0220	5.003E-04	.0271	5.667E-04	.0307	1.109E-03
T 7926(113)	33.36	31.86	.0220	5.001E-04	.0271	5.665E-04	.0307	1.109E-03
US 7972(113)	33.36	31.86	.0220	5.001E-04	.0271	5.665E-04	.0307	1.109E-03
LS 1964(113)	33.36	31.86	.0220	5.001E-04	.0271	5.665E-04	.0307	1.109E-03
T 7937(113)	35.44	33.94	.0213	4.845E-04	.0263	5.489E-04	.0298	1.074E-03
H 7785(113)	35.44	33.94	.0213	4.845E-04	.0263	5.489E-04	.0298	1.074E-03
LS 1969(113)	35.44	33.94	.0213	4.845E-04	.0263	5.489E-04	.0298	1.074E-03
US 7973(113)	35.47	33.96	.0213	4.843E-04	.0263	5.487E-04	.0298	1.074E-03
T 7934(113)	37.52	36.01	.0207	4.703E-04	.0255	5.328E-04	.0289	1.043E-03
H 7786(113)	37.52	36.01	.0207	4.703E-04	.0255	5.328E-04	.0289	1.043E-03
LS 1970(113)	37.52	36.01	.0207	4.703E-04	.0255	5.328E-04	.0289	1.043E-03
US 7974(113)	37.54	36.04	.0206	4.702E-04	.0245	5.327E-04	.0289	1.042E-03

MODEL HAS LEFT CENTERLINE

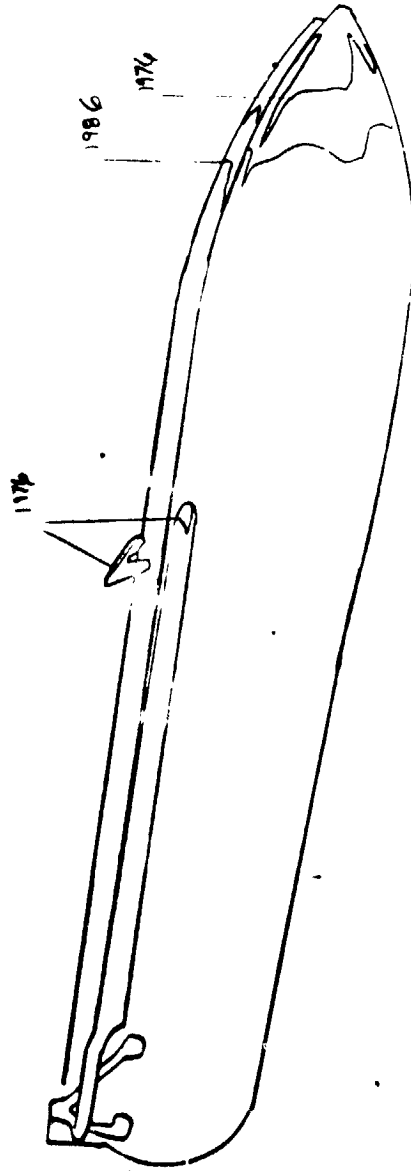
077

7766  
GP 12  
Upper Side



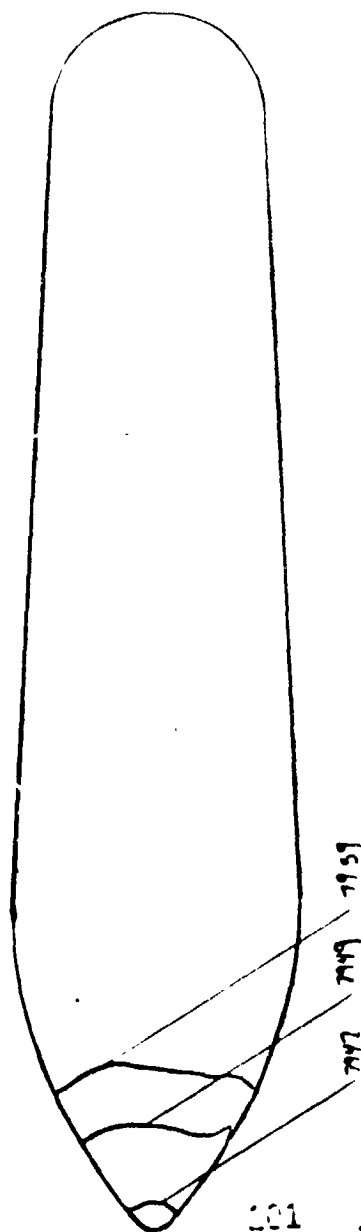


Group 12  
7908  
Lower Side  
MO

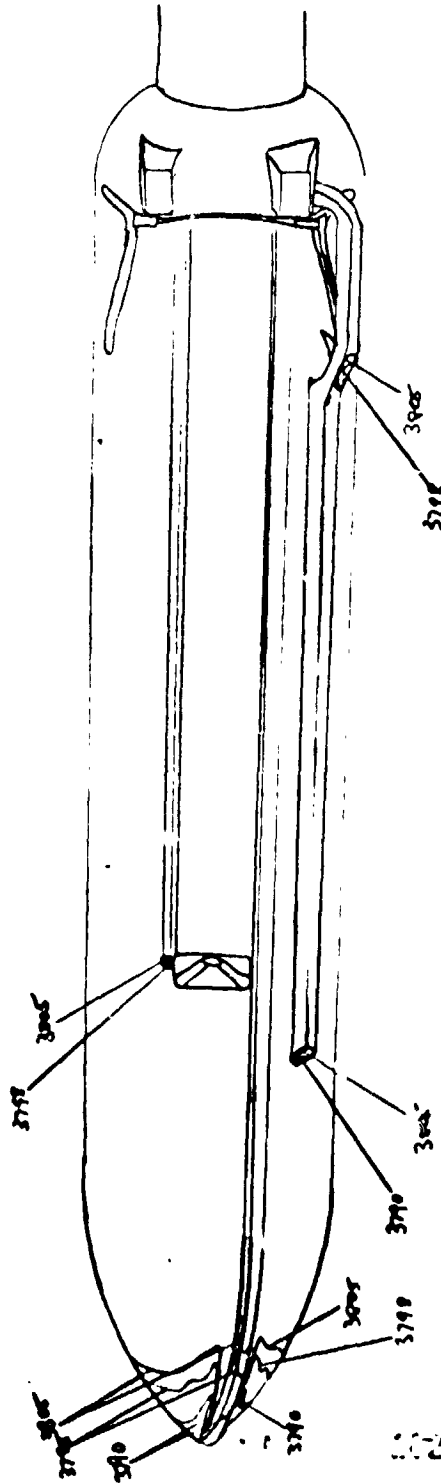


REPRODUCIBILITY OF THE ORIGINAL PAGE IS POOR.

Group 12  
8223  
Top  
MOR



8234  
GP 12  
Bottom



Cue

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6/29/73

AEDC(ARO-INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL R

NASA-R1 ORBITER HEATING

VA289

GROUP	CONFIG	MODEL	MACH NO	PO(PSIA)	TO(DEG R)	ALPHA-MODEL	ALPHA-SECTOR	ALPHA-PREBEND	ROLL-MODEL	YAW
12	A	TANK	7.96	123.2	1193	-5.03	5.03	0	180.00	-0.00
T-1NF	P-1NF	Q-1NF	V-1NF	RHO-1NF	MU-1NF	RE/FT	MREF	STREF		
(DEG R)	(PSIA)	(PSIA)	(FT/SEC)	(SLUGS/FT <sup>3</sup> )	(LR-SEC/FT <sup>2</sup> )	(FT-1)	(R= .0175FT)	(R= .0175FT)		
87.7	.013	.578	3643	1.243E-05	7.023E-08	6.401E 05	1.840E-02	5.103E-02		
CAMERA	ROLL NO	PAINT TEMP (DEG F)	INITIAL TEMP (DEG F)	SQUARE ROOT (RHOXCK)	TRAR(TO)	BETA(TO)				
TOP(T)	8223		79	.0506		0				
UPPER SINE(1/5)	7766		169			0				
LOWER SINE(1/5)	7504									
MOTICM(18)	8234									

PTC NO	TIME	DELTIME	M(TO)	M(TO)/MREF	M(.9TO)	M(.9TO)/MREF	M(.85TO)	M(.85TO)/MREF	ST(TO)
T 7939(169)	1.15		MODEL HAS NOT REACHED CENTERLINE						
M 7787(169)	1.15		MODEL HAS NOT REACHED CENTERLINE						
US 7475(169)	1.18		MODEL HAS NOT REACHED CENTERLINE						
LS 1971(169)	1.18		MODEL HAS NOT REACHED CENTERLINE						
T 7940(169)	2.25		MODEL HAS NOT REACHED CENTERLINE						
M 7788(169)	2.25		MODEL HAS NOT REACHED CENTERLINE						
LS 1972(169)	2.25		MODEL HAS NOT REACHED CENTERLINE						
US 7974(169)	2.28		MODEL HAS NOT REACHED CENTERLINE						
INJECT TIME = 2.6R									
T 7941(169)	3.23	1.03	5.136E-03	.2791	4.464E-03	.3513	7.427E-03	.4036	1.408E-02
M 7789(169)	3.23	1.03	5.136E-03	.2791	4.464E-03	.3513	7.427E-03	.4036	1.408E-02
LS 1973(169)	3.23	1.03	5.136E-03	.2791	4.464E-03	.3513	7.427E-03	.4036	1.408E-02
US 7977(169)	3.25	1.05	5.136E-03	.2791	4.464E-03	.3513	7.427E-03	.4036	1.408E-02
T 7942(169)	4.41	2.00	4.073E-03	.2213	5.127E-03	.2795	5.890E-03	.3199	1.116E-02
M 7790(169)	4.41	2.00	4.073E-03	.2213	5.127E-03	.2795	5.890E-03	.3199	1.116E-02
LS 1974(169)	4.41	2.00	4.073E-03	.2213	5.127E-03	.2795	5.890E-03	.3199	1.116E-02
US 7978(169)	4.43	2.01	4.056E-03	.2205	5.107E-03	.2775	5.865E-03	.3188	1.113E-02
T 7943(169)	5.48	3.00	3.479E-03	.1890	4.379E-03	.2380	5.031E-03	.2734	9.537E-03
M 7791(169)	5.48	3.00	3.479E-03	.1890	4.379E-03	.2380	5.031E-03	.2734	9.537E-03
LS 1975(169)	5.48	3.00	3.479E-03	.1890	4.379E-03	.2380	5.031E-03	.2734	9.537E-03
US 7979(169)	5.51	4.00	3.479E-03	.1890	4.379E-03	.2380	5.031E-03	.2734	9.537E-03
T 7944(169)	6.56	5.05	3.079E-03	.1676	3.845E-03	.2199	4.463E-03	.2423	8.448E-03
M 7792(169)	6.56	5.05	3.079E-03	.1676	3.845E-03	.2199	4.463E-03	.2423	8.448E-03
LS 1976(169)	6.56	5.05	3.079E-03	.1676	3.845E-03	.2199	4.463E-03	.2423	8.448E-03
US 7980(169)	6.58	5.08	3.079E-03	.1673	3.845E-03	.2199	4.463E-03	.2423	8.448E-03
T 7945(169)	7.63	6.13	2.802E-03	.1523	3.527E-03	.1917	4.053E-03	.2202	7.682E-03
M 7793(169)	7.63	6.13	2.802E-03	.1523	3.527E-03	.1917	4.053E-03	.2202	7.682E-03

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6/29/73

AEDC(ARO,INC.) ARNOLD AFS, TENNESSEE  
VON KAPLAN GAS DYNAMICS FACILITY  
50 INCH HYPERSONIC TUNNEL R

NASA-R1 ORBITER HEATING

VA249

GROUP CONFIG MODEL MACH NO PO(PSTIA) TO(CEG R) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREBEND ROLL-MODEL YAW

12 8 7.96 123.3 1193 -5.03 5.03 0 180.00 -0.00

T-INF Q-INF V-INF RMO-INF MU-INF HF/FT MREF STREF

(DEG R) (PSTIA) (FT/SEC) (SLUGS/FT<sup>3</sup>) (LB-SEC/FT<sup>2</sup>) (FT-1) (R=.0175FT) (R=.0175FT)

87.2 .013 .578 3643 1.255E-05 7.022E-08 6.408E-05 1.940E-02 5.100E-02

CAMFRA ROLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHOXCKX) TBAR(TOI) BETA(TOI)

TOP(T) 8223 79 .0504 1.377E-01 1.3713E-01

UPPER SIDE(US) 7766

LOWER SIDE(LS) 7508

MOTOM(R) 8234

019

PTC NO	TIME DELTIME	M(TOI)	M(TOI)/MREF	M(-9TO)	M(-9TO)/MREF	M(.85TO)	M(.85TO)/MREF	ST(TOI)
US 7981(169)	7.66	2.797E-03	.1519	3.520E-03	.1912	4.044E-03	.2197	7.661E-03
LS 1977(169)	7.66	2.797E-03	.1519	3.520E-03	.1912	4.044E-03	.2197	7.661E-03
T 7946(169)	8.71	2.545E-03	.1403	3.253E-03	.1746	3.738E-03	.2029	7.074E-03
M 7794(169)	8.71	2.545E-03	.1403	3.253E-03	.1746	3.738E-03	.2029	7.074E-03
US 7982(169)	8.74	2.580E-03	.1402	3.248E-03	.1765	3.731E-03	.2028	7.073E-03
LS 1974(169)	8.74	2.580E-03	.1402	3.248E-03	.1765	3.731E-03	.2028	7.073E-03
M 7795(169)	9.79	2.411E-03	.1310	3.035E-03	.1648	3.486E-03	.1894	6.604E-03
T 7547(169)	9.81	2.407E-03	.1308	3.030E-03	.1646	3.481E-03	.1891	6.594E-03
US 7983(169)	9.81	2.407E-03	.1308	3.030E-03	.1646	3.481E-03	.1891	6.594E-03
LS 1974(169)	9.81	2.407E-03	.1308	3.030E-03	.1646	3.481E-03	.1891	6.594E-03
T 7948(169)	10.89	2.65F-03	.1230	2.851E-03	.1549	3.275E-03	.1779	6.205E-03
US 7984(169)	10.89	2.65F-03	.1230	2.851E-03	.1549	3.275E-03	.1779	6.205E-03
M 7796(169)	10.89	2.245E-03	.1230	2.851E-03	.1549	3.275E-03	.1779	6.205E-03
LS 1980(169)	10.89	2.245E-03	.1230	2.851E-03	.1549	3.275E-03	.1779	6.205E-03
T 7949(169)	11.54	2.148E-03	.1166	2.744E-03	.1448	3.105E-03	.1686	5.879E-03
US 7987(169)	11.54	2.148E-03	.1166	2.744E-03	.1448	3.105E-03	.1686	5.879E-03
LS 1981(169)	11.54	2.148E-03	.1166	2.744E-03	.1448	3.105E-03	.1686	5.879E-03
M 7797(169)	11.54	2.148E-03	.1166	2.744E-03	.1448	3.105E-03	.1686	5.879E-03
T 7950(169)	11.54	2.148E-03	.1166	2.744E-03	.1448	3.105E-03	.1686	5.879E-03
US 7985(169)	11.54	2.045F-03	.1111	2.574E-03	.1398	2.957E-03	.1606	5.602E-03
LS 1982(169)	11.54	2.045F-03	.1111	2.574E-03	.1398	2.957E-03	.1606	5.602E-03
M 7798(169)	13.04	2.043F-03	.1109	2.571E-03	.1396	2.954E-03	.1604	5.592E-03
LS 1982(169)	13.04	2.043F-03	.1109	2.571E-03	.1396	2.954E-03	.1604	5.592E-03
T 7951(169)	14.09	1.956F-03	.1061	2.462E-03	.1316	2.828E-03	.1535	5.349E-03
US 7987(169)	14.09	1.956F-03	.1061	2.462E-03	.1316	2.828E-03	.1535	5.349E-03
LS 1987(169)	14.12	1.956F-03	.1061	2.462E-03	.1316	2.828E-03	.1535	5.349E-03
M 7799(169)	14.12	1.956F-03	.1061	2.462E-03	.1316	2.828E-03	.1535	5.349E-03
US 1983(169)	14.12	1.956F-03	.1061	2.462E-03	.1316	2.828E-03	.1535	5.349E-03

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6H2VA

AECC (ARO, INC.) ARNOLD AFS, TENNESSEE  
VON KARMAN GAS DYNAMICS FACILITY  
50 INCH HYPERSONIC TUNNEL A

6/29/73

GROUP	CONFIG	MODEL	MACH NO	POI(PSIA)	TO(DEG P)	ALPHA-MODEL	ALPHA-SECTOR	ALPHA-PREBEND	ROLL-MODEL	YAW
12	A	TANK	7.96	123.4	1193	-5.03	5.03	0	180.00	-0.00

Y-LAB	P-INF	Q-INF	V-INF	RMO-INF	MU-INF	RF/FT	MRF	STREF
(DEG R)	(PSIA)	(PSIA)	(FT/SFC)	(SLUGS/FT3)	(LBS-SEC./T2)	(FT-1)	(M = .0175FT)	(M = .0175FT)
87.2	.013	.579	36.4	1.246E-05	7.022E+08	6.513E 05	1.841E-02	5.09AE-02

CAMFRA	ROLL NO	PAINT TEMP (DEG F)	INITIAL TEMP (DEG F)	SQUARE ROOT (RHOXICK)	TRAR(TO)	BETA(TO)
1	1	1	1	1	1	1

10P(1) 0227

NAME	DATE	TIME	LOCATION	STATUS	REMARKS
JOHN DOE	2023-10-27	14:30	Room 101	Present	Meeting with client
JANE SMITH	2023-10-27	15:00	Room 101	Present	Meeting with client
BOB JONES	2023-10-27	15:30	Room 101	Present	Meeting with client
ALICE BROWN	2023-10-27	16:00	Room 101	Present	Meeting with client
CHARLIE GREEN	2023-10-27	16:30	Room 101	Present	Meeting with client
DAVID WHITE	2023-10-27	17:00	Room 101	Present	Meeting with client
EVE BLACK	2023-10-27	17:30	Room 101	Present	Meeting with client
FRANK GRAY	2023-10-27	18:00	Room 101	Present	Meeting with client
GRACE HARRIS	2023-10-27	18:30	Room 101	Present	Meeting with client
HELEN KING	2023-10-27	19:00	Room 101	Present	Meeting with client
IRVING LYNN	2023-10-27	19:30	Room 101	Present	Meeting with client
JACK MASON	2023-10-27	20:00	Room 101	Present	Meeting with client
JILL NELSON	2023-10-27	20:30	Room 101	Present	Meeting with client
JOHN O'BRIEN	2023-10-27	21:00	Room 101	Present	Meeting with client
JANE PETERSON	2023-10-27	21:30	Room 101	Present	Meeting with client
BOB ROBERTS	2023-10-27	22:00	Room 101	Present	Meeting with client
ALICE SCOTT	2023-10-27	22:30	Room 101	Present	Meeting with client
CHARLIE TAYLOR	2023-10-27	23:00	Room 101	Present	Meeting with client
DAVID WALKER	2023-10-27	23:30	Room 101	Present	Meeting with client
EVE YOUNG	2023-10-27	00:00	Room 101	Present	Meeting with client
FRANK ZIMMERMAN	2023-10-27	00:30	Room 101	Present	Meeting with client
GRACE ADAMS	2023-10-27	01:00	Room 101	Present	Meeting with client
HELEN BAKER	2023-10-27	01:30	Room 101	Present	Meeting with client
IRVING CAMPBELL	2023-10-27	02:00	Room 101	Present	Meeting with client
JACK COOPER	2023-10-27	02:30	Room 101	Present	Meeting with client
JILL EVANS	2023-10-27	03:00	Room 101	Present	Meeting with client
JOHN FOSTER	2023-10-27	03:30	Room 101	Present	Meeting with client
JANE GIBSON	2023-10-27	04:00	Room 101	Present	Meeting with client
BOB HAMILTON	2023-10-27	04:30	Room 101	Present	Meeting with client
ALICE HENDERSON	2023-10-27	05:00	Room 101	Present	Meeting with client
CHARLIE HILL	2023-10-27	05:30	Room 101	Present	Meeting with client
DAVID JONES	2023-10-27	06:00	Room 101	Present	Meeting with client
EVE KELLY	2023-10-27	06:30	Room 101	Present	Meeting with client
FRANK LEWIS	2023-10-27	07:00	Room 101	Present	Meeting with client
GRACE MORGAN	2023-10-27	07:30	Room 101	Present	Meeting with client
HELEN NICHOLS	2023-10-27	08:00	Room 101	Present	Meeting with client
IRVING ORTEGA	2023-10-27	08:30	Room 101	Present	Meeting with client
JACK PEREZ	2023-10-27	09:00	Room 101	Present	Meeting with client
JILL QUINN	2023-10-27	09:30	Room 101	Present	Meeting with client
JOHN REED	2023-10-27	10:00	Room 101	Present	Meeting with client
JANE ROSS	2023-10-27	10:30	Room 101	Present	Meeting with client
BOB STEVENSON	2023-10-27	11:00	Room 101	Present	Meeting with client
ALICE THOMAS	2023-10-27	11:30	Room 101	Present	Meeting with client
CHARLIE TUCKER	2023-10-27	12:00	Room 101	Present	Meeting with client
DAVID VAUGHAN	2023-10-27	12:30	Room 101	Present	Meeting with client
EVE WATSON	2023-10-27	13:00	Room 101	Present	Meeting with client
FRANK WELLS	2023-10-27	13:30	Room 101	Present	Meeting with client
GRACE WILSON	2023-10-27	14:00	Room 101	Present	Meeting with client
HELEN WOOD	2023-10-27	14:30	Room 101	Present	Meeting with client
IRVING WYATT	2023-10-27	15:00	Room 101	Present	Meeting with client
JACK YOUNG	2023-10-27	15:30	Room 101	Present	Meeting with client
JILL ZIMMERMAN	2023-10-27	16:00	Room 101	Present	Meeting with client
JOHN ADAMS	2023-10-27	16:30	Room 101	Present	Meeting with client
JANE BAKER	2023-10-27	17:00	Room 101	Present	Meeting with client
BOB CAMPBELL	2023-10-27	17:30	Room 101	Present	Meeting with client
ALICE COOPER	2023-10-27	18:00	Room 101	Present	Meeting with client
CHARLIE EVANS	2023-10-27	18:			

LOANF4 SINELLS) 7509  
WOTTCM(9) 8234

UN DISC NO FIVE DELIVERED

**MITO:**

**W(TO)/WREF**

MI.910)

**W(,9T0)/WREF**

W(0.8510)

MI(85TO)/HREF

57(YO)

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 6/29/73

# NASA-B-1 ORBITER HEATING

VA289

AECI(ARJ-INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL #

GROUP CONFIG MODEL MACH NO PO(PSIA) TO(DEG R) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREBEND ROLL-MODEL YAW  
 12 7.96 123.6 1193 -5.03 5.03 0 180.00 -0.00

T-INF P-INF Q-INF V-INF MU-INF RHU-INF RF/F1 HREF STREF  
 (DEG R) (PSIA) (PSIA) (FT/SFC) (SLUGS/FT<sup>3</sup>) (LR-SEC/FT<sup>2</sup>) (FT-1) (R= .0175FT) (R= .0175FT)  
 87.2 .013 .520 36.3 1.247E-05 7.023E-08 6.522E 05 1.843E-02 5.094E-02

CAMERA ROLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RH0/CKK) TBAR(10) BETAI(10)  
 TOP(1) 8223 79 .0506 1.377E-01 1.3713E-01  
 UPPER SIDE(US) 7766  
 LOWER SIDE(LS) 7908  
 BOTTOM(B) 8234

PIC NO	TIME	M(TO)	M(TO)/HREF	M(0.9 D)	M(.9TO)/HREF	M(.85TO)	M(.65TO)/HREF	ST(10)
US 7994(169)	23.50	1.479E-03	.0703	1.862E-03	.1011	2.139E-03	.1162	4.049E-03
T 7959(169)	25.55	1.415E-03	.0768	1.781E-03	.0967	2.046E-03	.1111	3.873E-03
M 7807(169)	25.55	1.415E-03	.0768	1.781E-03	.0967	2.046E-03	.1111	3.873E-03
LS 1991(169)	25.55	1.415E-03	.0768	1.781E-03	.0967	2.046E-03	.1111	3.873E-03
US 7995(169)	25.58	1.415E-03	.0767	1.780E-03	.0966	2.045E-03	.1110	3.867E-03
T 7260(169)	27.63	1.357E-03	.0737	1.709E-03	.0928	1.963E-03	.1066	3.715E-03
M 7808(169)	27.63	1.357E-03	.0737	1.709E-03	.0928	1.963E-03	.1066	3.715E-03
US 7996(169)	27.66	1.357E-03	.0737	1.709E-03	.0927	1.962E-03	.1065	3.714E-03
LS 1992(169)	27.66	1.357E-03	.0737	1.709E-03	.0927	1.962E-03	.1065	3.714E-03
M 7809(169)	29.71	1.307E-03	.0709	1.645E-03	.0892	1.888E-03	.1025	3.570E-03
T 7661(169)	29.73	1.306E-03	.0709	1.644E-03	.0893	1.887E-03	.1025	3.574E-03
US 7997(169)	29.73	1.306E-03	.0709	1.644E-03	.0893	1.887E-03	.1025	3.574E-03
LS 1993(169)	29.73	1.306E-03	.0709	1.644E-03	.0893	1.887E-03	.1025	3.574E-03
T 7662(169)	31.81	1.240E-03	.0684	1.546E-03	.0861	1.823E-03	.0989	3.444E-03
M 7810(169)	31.81	1.240E-03	.0684	1.546E-03	.0861	1.823E-03	.0989	3.444E-03
US 7998(169)	31.81	1.240E-03	.0684	1.546E-03	.0861	1.823E-03	.0989	3.444E-03
LS 1994(169)	31.81	1.240E-03	.0684	1.546E-03	.0861	1.823E-03	.0989	3.444E-03
M 7811(169)	33.89	1.200E-03	.0662	1.505E-03	.0843	1.822E-03	.0989	3.448E-03
US 7999(169)	33.89	1.200E-03	.0662	1.505E-03	.0843	1.822E-03	.0989	3.448E-03
LS 1995(169)	33.89	1.200E-03	.0662	1.505E-03	.0843	1.822E-03	.0989	3.448E-03
T 7663(169)	35.57	1.129E-03	.0641	1.434E-03	.0832	1.763E-03	.0957	3.335E-03
M 7812(169)	35.57	1.129E-03	.0641	1.434E-03	.0832	1.763E-03	.0957	3.335E-03
US 7999(169)	35.57	1.129E-03	.0641	1.434E-03	.0832	1.763E-03	.0957	3.335E-03
LS 1996(169)	35.57	1.129E-03	.0641	1.434E-03	.0832	1.763E-03	.0957	3.335E-03
T 7664(169)	36.52	1.129E-03	.0641	1.434E-03	.0832	1.763E-03	.0957	3.335E-03
M 7813(169)	36.52	1.129E-03	.0641	1.434E-03	.0832	1.763E-03	.0957	3.335E-03
US 7999(169)	36.52	1.129E-03	.0641	1.434E-03	.0832	1.763E-03	.0957	3.335E-03
LS 1996(169)	36.52	1.129E-03	.0641	1.434E-03	.0832	1.763E-03	.0957	3.335E-03
T 7664(169)	36.52	1.129E-03	.0641	1.434E-03	.0832	1.763E-03	.0957	3.335E-03
M 7813(169)	36.52	1.129E-03	.0641	1.434E-03	.0832	1.763E-03	.0957	3.335E-03

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 6/29/73

NASA-R1 ORBITER HEATING  
 VA289

AEDCI(ARO, INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL R

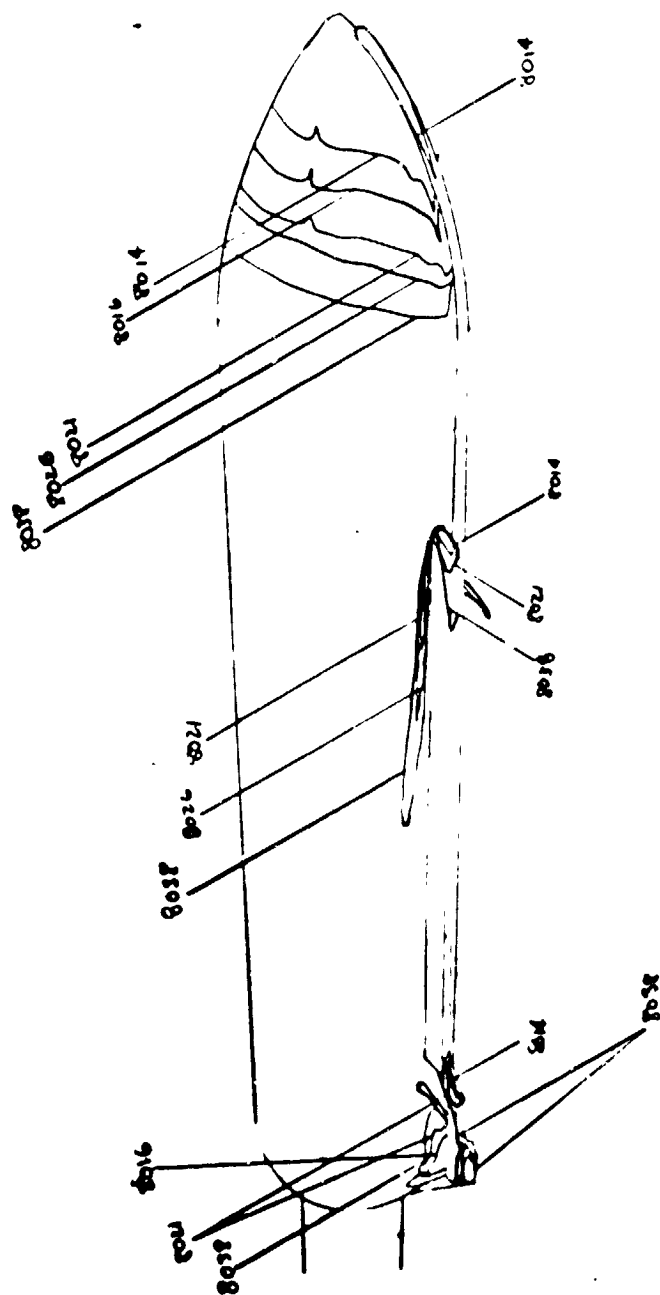
GROUP	CONFID	MODEL	TANK	MACH NO	PO(PSTA)	TO(IDEG)	ALPHA-MODEL	ALPHA-SECTOR	ALPHA-PREBEND	ROLL-MODEL	YAW
12	A			7.96	123.6	1193	-5.03	5.03	0	180.00	-0.00
T-1AF	P-INF	Q-INF	V-INF			MU-INF	DE/FT	HREF			
(DEG R)	(PSTA)	(PSTA)	(FT/SEC)			(LR-SEC/FT2)	(FT-1)	(R= .0175FT)	STREF		
87.2	.013	.580	3643		1.258E-05	7.222E-08	6.524E 05	1.843E-02	(R= .0175FT)		
CAMERA	ROLL NO	PAINT TEMP (DEG F)	INITIAL TEMP (DEG F)	SQUARE ROOT (RHOXCKX)	TBAR(10)	BETA(10)					
TOP(T)	8223										
UPPER SINE(US)	7766										
LOWER SINE(LS)	7508										
MOTOM(19)	8234										

PIR NO	TIME DELTIME	M(10)	M(10)/HREF	M(10)	M(10)/HREF	M(10)	M(10)/HREF	ST(10)
US P001(160)	38.04 36.54	1.148E-03	.0623	1.445E-03	.0744	1.660E-03	.0900	3.137E-03
	38.24							

MODEL WAS LEFT CENTERLINE



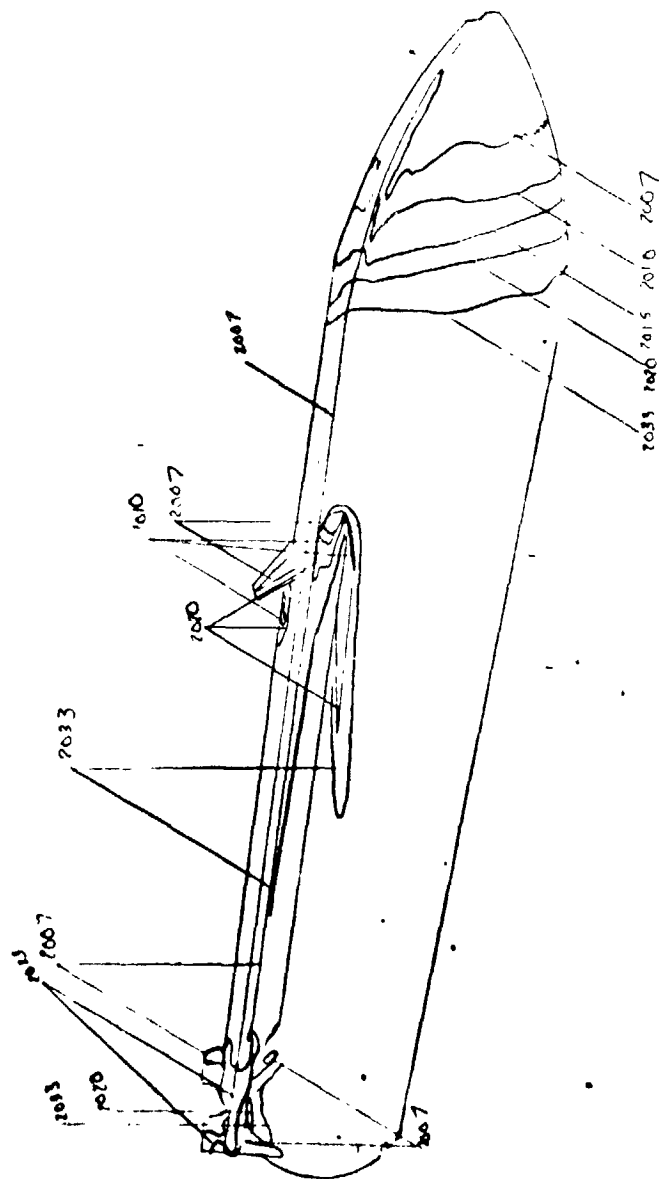
8244  
GP 13 .  
UPPER SIDE



CWC

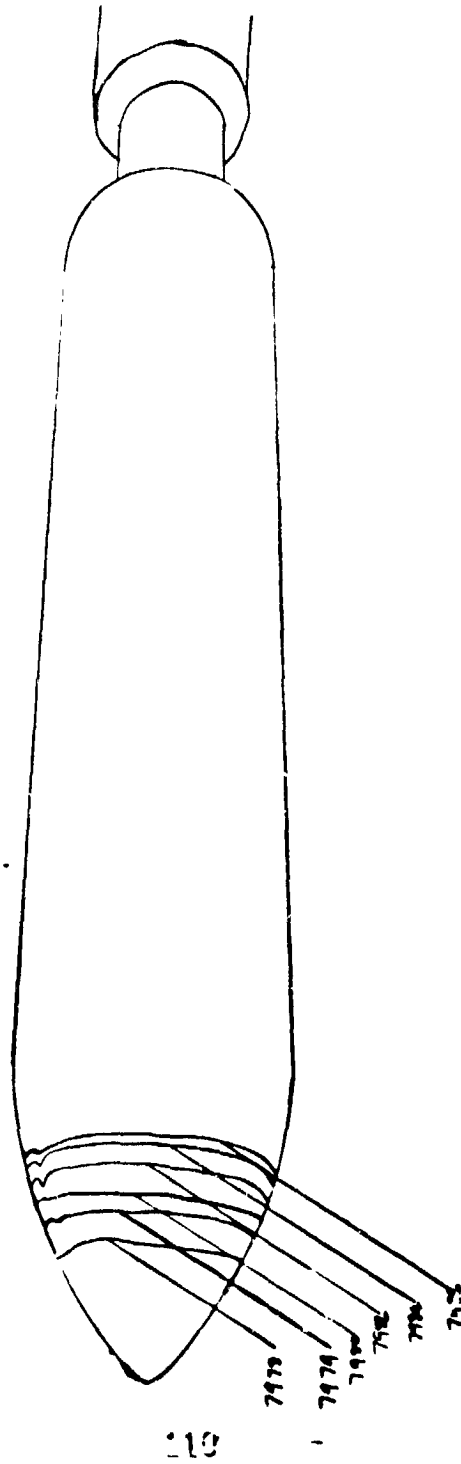
8495  
6F13  
Lower Side

5



8108  
GP 13  
TOP

CC



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6/29/73

# NASA-RI ORBITER HEATING

AEDC(ARO, INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL #

74289

GROUP CNFRTG MODEL TANK MACH NO PO(PSIA) TO( DEG R) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREBEND ROLL-MODEL YAW

13 7.96 122.9 1194 -5.03 5.03 0 180.00 -0.00

T-INF P-INF O-INF V-INF RHO-INF MU-INF RF/FT HREF STREF  
 (DEG R) (PSIA) (FT/SEC) (SLUGS/FT<sup>3</sup>) (LR-SEC/FT<sup>2</sup>) (FT-1) (R= .0175FT) (R= .0175FT)

87.3 .013 .577 3644 1.249E-05 7.029E-08 6.479E 05 1.838E-02 5.111E-02

CAMERA ROLL NO PAINT IFMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHO/CXK) TRAR(TO) BETA(TO)

TOP(1) 8108 79 .0475 0 0

UPPER SIDE(US) 8244

LOWER SIDE(LS) 8495

MOTOM(18) 8234

PIC NO TIME DELTIME H(TO) HREF H(-910) HREF H(-85TO) HREF H(-85TO) ST(TO)

T 7976(113) 1.15 MODEL HAS NOT REACHED CENTERLINE

LS 2005(113) 1.15 MODEL HAS NOT REACHED CENTERLINE

US 8012(113) 1.18 MODEL HAS NOT REACHED CENTERLINE

T 7977(113) 2.23 MODEL HAS NOT REACHED CENTERLINE

LS 2006(113) 2.23 MODEL HAS NOT REACHED CENTERLINE

US 8013(113) 2.25 MODEL HAS NOT REACHED CENTERLINE

INJECT TIME = 2.68

T 7978(113) 3.30 1.699E-03 .0925 2.098E-03 .1143 2.377E-03 .1295 4.699E-03

LS 2007(113) 3.30 1.699E-03 .0925 2.098E-03 .1143 2.377E-03 .1295 4.699E-03

US 8014(113) 3.33 1.647E-03 .0919 2.098E-03 .1143 2.377E-03 .1295 4.699E-03

T 7979(113) 4.36 2.85 1.350E-03 .0735 1.667E-03 .0908 1.889E-03 .1029 3.733E-03

US 8015(113) 4.38 2.88 1.344E-03 .0732 1.659E-03 .0904 1.881E-03 .1024 3.714E-03

LS 2008(113) 4.38 2.88 1.344E-03 .0732 1.659E-03 .0904 1.881E-03 .1024 3.714E-03

T 7980(113) 5.43 3.93 1.150E-03 .0626 1.420E-03 .0773 1.609E-03 .0877 3.179E-03

US 8016(113) 5.46 3.95 1.146E-03 .0625 1.416E-03 .0771 1.604E-03 .0874 3.171E-03

LS 2009(113) 5.46 3.95 1.146E-03 .0625 1.416E-03 .0771 1.604E-03 .0874 3.171E-03

T 7981(113) 6.51 5.00 1.019E-03 .0555 1.294E-03 .0646 1.424E-03 .0777 2.819E-03

US 8017(113) 6.51 5.00 1.019E-03 .0555 1.294E-03 .0646 1.424E-03 .0777 2.819E-03

LS 2010(113) 6.53 5.07 1.014E-03 .0554 1.293E-03 .0644 1.424E-03 .0775 2.811E-03

T 7982(113) 7.58 6.08 9.242E-04 .0504 1.191E-03 .0622 1.294E-03 .0705 2.557E-03

US 8018(113) 7.58 6.08 9.242E-04 .0504 1.191E-03 .0622 1.294E-03 .0705 2.557E-03

LS 2011(113) 7.58 6.08 9.242E-04 .0504 1.191E-03 .0622 1.294E-03 .0705 2.557E-03

T 7983(113) 8.63 7.13 8.534E-04 .0465 1.054E-03 .0574 1.194E-03 .0651 2.361E-03

US 8019(113) 8.66 7.16 8.519E-04 .0464 1.052E-03 .0573 1.192E-03 .0650 2.357E-03

LS 2012(113) 8.66 7.16 8.519E-04 .0464 1.052E-03 .0573 1.192E-03 .0650 2.357E-03

T 7984(113) 9.71 8.21 7.955E-04 .0433 9.824E-04 .0535 1.113E-03 .0606 2.199E-03

US 8020(113) 9.71 8.21 7.955E-04 .0433 9.824E-04 .0535 1.113E-03 .0606 2.199E-03

LS 2013(113) 9.71 8.21 7.955E-04 .0433 9.824E-04 .0535 1.113E-03 .0606 2.199E-03

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MASA-RI ORBITER HEATING

VA289

AEDC(APO, INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL R

GROUP CONFIG MODEL TANK MACH NO PO(P51A) TO( DEG R) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREBEND ROLL-MODEL YAW  
 13 P 7.96 122.7 1194 -5.03 5.03 0 180.00 -0.00

T-INF P-TINF Q-INF V-TINF MU-INF RMO-INF RF/FT HREF STREF  
 (DEG F) (P51A) (P51A) (FT/SEC) (SLUGS/FT<sup>3</sup>) (LB-SEC/FT<sup>2</sup>) (FT-1) (R= .0175FT) (H= .0175FT)  
 87.3 .013 .576 3045 1.247E-05 7.029E-08 6.467E 05 1.936E-02 5.116E-02

CAMERA ROLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHOXCKX) TBAR(TO) BETA(TO)  
 TOP(T) 8108 79 .0475 5.193E-02 4.7979E-02  
 UPPER SINE(US) 8244  
 LOWER SINE(LS) 8495  
 BOTTOM(B) 8234

PIC NO	TIME	DELTIME	H(TO)	H(TO)/HREF	H(.9TO)	H(.9TO)/HREF	H(.85TO)	H(.85TO)/HREF	ST(TO)
US A020(113)	9.74	8.23	7.943E-04	.0439	9.809E-04	.0535	1.112E-03	.0606	2.199E-03
T 7985(113)	10.79	9.29	7.940E-04	.0409	9.237E-04	.0503	1.047E-03	.0571	2.071E-03
LS 2014(113)	10.79	9.24	7.940E-04	.0409	9.237E-04	.0503	1.047E-03	.0571	2.071E-03
US A021(113)	10.81	9.31	7.940E-04	.0407	9.225E-04	.0502	1.045E-03	.0569	2.065E-03
T 7986(113)	11.66	10.36	7.908E-04	.0396	8.744E-04	.0476	9.909E-04	.0540	1.957E-03
LS 2015(113)	11.66	10.36	7.908E-04	.0396	8.744E-04	.0476	9.909E-04	.0540	1.957E-03
US A022(113)	11.89	10.39	7.907E-04	.0395	8.733E-04	.0476	9.897E-04	.0539	1.954E-03
T 7987(113)	12.51	11.41	6.747E-04	.0327	6.332E-04	.0454	9.442E-04	.0514	1.865E-03
US A023(113)	12.54	11.44	6.739E-04	.0327	6.322E-04	.0454	9.432E-04	.0514	1.866E-03
LS 2016(113)	12.54	11.44	6.739E-04	.0327	6.322E-04	.0454	9.432E-04	.0514	1.866E-03
T 7989(113)	13.59	12.49	6.449E-04	.0352	7.964E-04	.0434	9.024E-04	.0492	1.786E-03
LS 2017(113)	13.59	12.49	6.449E-04	.0352	7.964E-04	.0434	9.024E-04	.0492	1.786E-03
US A024(113)	14.02	12.51	6.443E-04	.0351	7.956E-04	.0434	9.017E-04	.0491	1.782E-03
T 7989(113)	15.07	13.54	6.144E-04	.0337	7.642E-04	.0416	8.660E-04	.0472	1.712E-03
LS 2018(113)	15.07	13.54	6.144E-04	.0337	7.642E-04	.0416	8.660E-04	.0472	1.712E-03
US A025(113)	15.09	13.59	6.142E-04	.0337	7.635E-04	.0416	8.652E-04	.0472	1.712E-03
T 7990(113)	16.14	14.64	5.956E-04	.0325	7.356E-04	.0401	8.334E-04	.0454	1.648E-03
LS 2019(113)	16.14	14.64	5.956E-04	.0325	7.356E-04	.0401	8.334E-04	.0454	1.648E-03
US A026(113)	16.17	14.67	5.951E-04	.0324	7.349E-04	.0401	8.324E-04	.0454	1.647E-03
T 7991(113)	17.19	15.69	5.753E-04	.0313	7.105E-04	.0387	8.052E-04	.0439	1.599E-03
US A027(113)	17.22	15.72	5.749E-04	.0313	7.099E-04	.0387	8.045E-04	.0439	1.592E-03
LS 2020(113)	17.22	15.72	5.749E-04	.0313	7.099E-04	.0387	8.045E-04	.0439	1.592E-03
T 7992(113)	18.27	16.77	5.506E-04	.0303	6.873E-04	.0375	7.789E-04	.0425	1.541E-03
LS 2021(113)	18.27	16.77	5.506E-04	.0303	6.873E-04	.0375	7.789E-04	.0425	1.541E-03
US A028(113)	18.20	16.79	5.501E-04	.0303	6.866E-04	.0374	7.783E-04	.0424	1.539E-03

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6/29/73

AEDICAR, INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL A

MASA-RI ORBITER HEATING  
 VA289

GROUP	CONFID	MODEL	MACH NO	POI(PIA)	TOILEG (F)	ALPHA-MODEL	ALPHA-SECTOR	ALPHA-PREBEND	ROLL-MODEL	YAW
13	R	TANK	7.96	122.6	1194	-5.03	5.03	0	180.00	-0.00
T-1NF	P-1NF	Q-1NF	V-1NF	RMQ-1NF	MU-1NF	RE/FT	MREF	STREF		
(DEG R)	(DEG A)	(DEG A)	(FT/SEC)	(SLURS/FT)	(LR-SEC/FT)	(FT-1)	(R= .0175FT)	(H= .0175FT)		
87.3	.013	.575	3645	1.246E-05	7.030E-08	6.441E 05	1.435E-02	5.118E-02		
CAMERA	ROLL NO	PAINT TEMP (DEG F)	INITIAL TEMP (DEG F)	SQUARE ROOT (RM-CACR)	TBAR(10)	BETA(10)				
TOP(1)	8108									
UPPER SINE(US)	8244									
LOWER SINE(LS)	8495									
MOTTCM(18)	8234									

PIC NO	TIME DELTIME	H(10)	H(10)/MREF	H(.910)	H(.910)/HREF	H(.2510)	H(.2510)/HREF	ST(10)
T 7993(113)	19.35	5.345E-04	.0294	6.663E-04	.0363	7.551E-04	.0411	1.493E-03
LS 2029(113)	19.35	5.345E-04	.0294	6.663E-04	.0363	7.551E-04	.0411	1.493E-03
US 8029(113)	19.37	5.345E-04	.0294	6.663E-04	.0363	7.551E-04	.0411	1.493E-03
T 7994(113)	20.42	5.239E-04	.0286	6.470E-04	.0353	7.333E-04	.0400	1.451E-03
US 8030(113)	20.42	5.239E-04	.0286	6.470E-04	.0353	7.333E-04	.0400	1.451E-03
LS 2023(113)	20.42	5.239E-04	.0286	6.470E-04	.0353	7.333E-04	.0400	1.451E-03
T 7995(113)	21.47	5.100E-04	.0278	6.294E-04	.0343	7.133E-04	.0389	1.410E-03
US 8031(113)	21.50	5.047E-04	.0278	6.294E-04	.0343	7.133E-04	.0389	1.410E-03
LS 2024(113)	21.50	5.047E-04	.0278	6.294E-04	.0343	7.133E-04	.0389	1.410E-03
T 7996(113)	22.55	4.948E-04	.0271	6.135E-04	.0334	6.952E-04	.0379	1.374E-03
US 8032(113)	22.55	4.948E-04	.0271	6.135E-04	.0334	6.952E-04	.0379	1.374E-03
LS 2025(113)	22.55	4.948E-04	.0271	6.135E-04	.0334	6.952E-04	.0379	1.374E-03
T 7997(113)	23.60	4.849E-04	.0264	5.984E-04	.0326	6.785E-04	.0370	1.342E-03
US 8033(113)	23.63	4.849E-04	.0264	5.984E-04	.0326	6.785E-04	.0370	1.342E-03
LS 2026(113)	23.63	4.849E-04	.0264	5.984E-04	.0326	6.785E-04	.0370	1.342E-03
T 7998(113)	24.68	4.745E-04	.0258	5.846E-04	.0319	6.621E-04	.0361	1.314E-03
US 8034(113)	24.68	4.745E-04	.0258	5.846E-04	.0319	6.621E-04	.0361	1.314E-03
LS 2027(113)	24.68	4.745E-04	.0258	5.846E-04	.0319	6.621E-04	.0361	1.314E-03
T 7999(113)	25.75	4.646E-04	.0252	5.713E-04	.0312	6.477E-04	.0353	1.281E-03
US 8035(113)	25.75	4.646E-04	.0252	5.713E-04	.0312	6.477E-04	.0353	1.281E-03
LS 2028(113)	25.75	4.646E-04	.0252	5.713E-04	.0312	6.477E-04	.0353	1.281E-03
T 8000(113)	26.83	4.542E-04	.0242	5.485E-04	.0299	6.214E-04	.0339	1.230E-03
US 8036(113)	26.83	4.542E-04	.0242	5.485E-04	.0299	6.214E-04	.0339	1.230E-03
LS 2029(113)	26.83	4.542E-04	.0242	5.485E-04	.0299	6.214E-04	.0339	1.230E-03
T 8001(113)	27.91	4.437E-04	.0233	5.281E-04	.0288	5.944E-04	.0326	1.185E-03
US 8037(113)	27.91	4.437E-04	.0233	5.281E-04	.0288	5.944E-04	.0326	1.185E-03
LS 2030(113)	27.91	4.437E-04	.0233	5.281E-04	.0288	5.944E-04	.0326	1.185E-03

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6/29/73

PASA-PI ORBITER HEATING

AEDC(ARO, INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL A

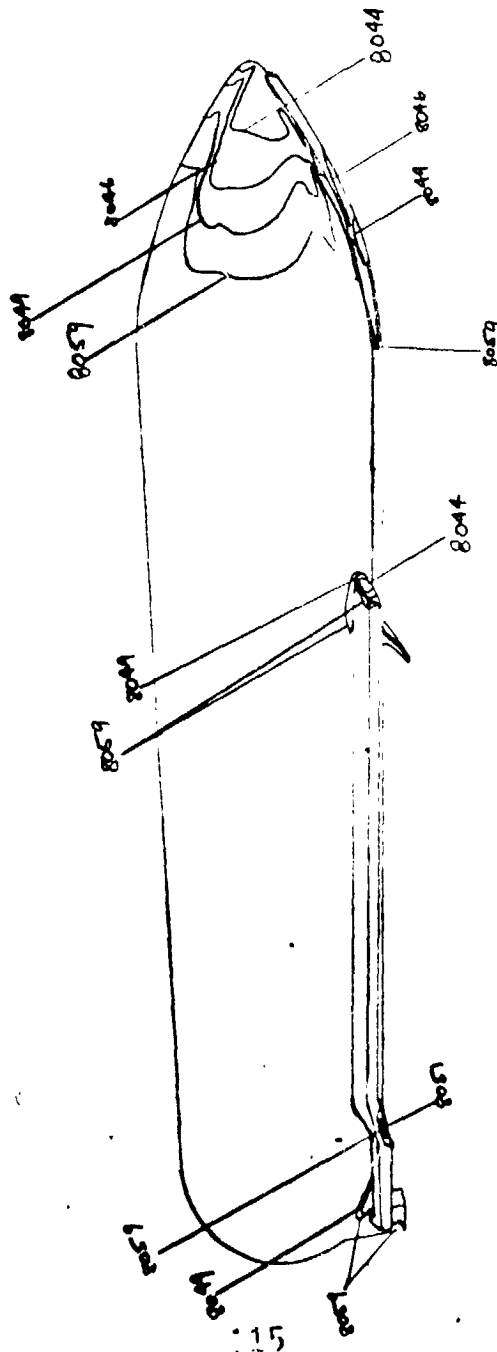
VA299

GROUP	CONFIG	MODEL	TANK	MACH NO	Q0(P51A)	T0(DEG F)	ALPHA-MODEL	ALPHA-SECTOR	ALPHA-PREPEND	ROLL-MODEL	YAW
13	P			7.96	122.4	1194	-5.03	5.02	0	180.00	-0.00
T-1AF	P-1AF	Q-1AF	V-1AF	RMO-1AF	MU-1AF	RE/FT	MREF	STREF			
(DEG F)	(P51A)	(P51A)	(FT/SFC)	(SLUGS/FT3)	(LBS-SEC/FT2)	(FT-1)	(R= .0175FT)	(R= .0175FT)			
87.3	.013	.576	3644	1.244E-05	7.029E-08	6.452E 05	1.834E-02	5.122E-02			
CAMERA	ROLL NO	PAINT TEMP (DEG F)	INITIAL TEMP (DEG F)	SQUARE ROOT (RHOXCXK)	TBAR(TO)	BETA(TO)					
TOP(T)	810R		79	.0475	5.193E-02	4.7979E-02					
UPPER SIDE(LS)	8244										
LOWER SIDE(LS)	8495										
MOTCH(R)	8234										

PIC NO	TYPE	DELTIME	M(TO)	M(TO)/MREF	M(.9TO)	M(.9TO)/MREF	M(.85TO)	M(.85TO)/MREF	ST(TO)
US 9037(113)	29.93	28.43	4.274E-04	.0233	5.278E-04	.0248	5.982E-04	.0326	1.183E-03
T 9002(113)	31.59	30.48	4.128E-04	.0225	5.098E-04	.0278	5.777E-04	.0315	1.143E-03
US 9038(113)	31.59	30.48	4.128E-04	.0225	5.098E-04	.0278	5.777E-04	.0315	1.143E-03
LS 2031(113)	31.59	30.48	4.128E-04	.0225	5.098E-04	.0278	5.777E-04	.0315	1.143E-03
T 9003(113)	34.04	32.54	3.995E-04	.0218	4.934E-04	.0260	5.592E-04	.0305	1.106E-03
LS 2032(113)	34.04	32.54	3.995E-04	.0218	4.934E-04	.0260	5.592E-04	.0305	1.106E-03
US 9034(113)	36.12	34.61	3.874E-04	.0211	4.784E-04	.0261	5.421E-04	.0295	1.073E-03
T 9004(113)	36.12	34.61	3.874E-04	.0211	4.784E-04	.0261	5.421E-04	.0295	1.073E-03
LS 2033(113)	36.14	34.64	3.972E-04	.0211	4.782E-04	.0261	5.419E-04	.0296	1.074E-03
US 9005(113)	36.19	34.69	3.742E-04	.0205	4.646E-04	.0253	5.266E-04	.0287	1.043E-03
T 9006(113)	36.19	34.69	3.742E-04	.0205	4.646E-04	.0253	5.266E-04	.0287	1.043E-03
LS 2034(113)	38.67	38.67	3.702E-04	.0205	4.646E-04	.0253	5.266E-04	.0287	1.043E-03

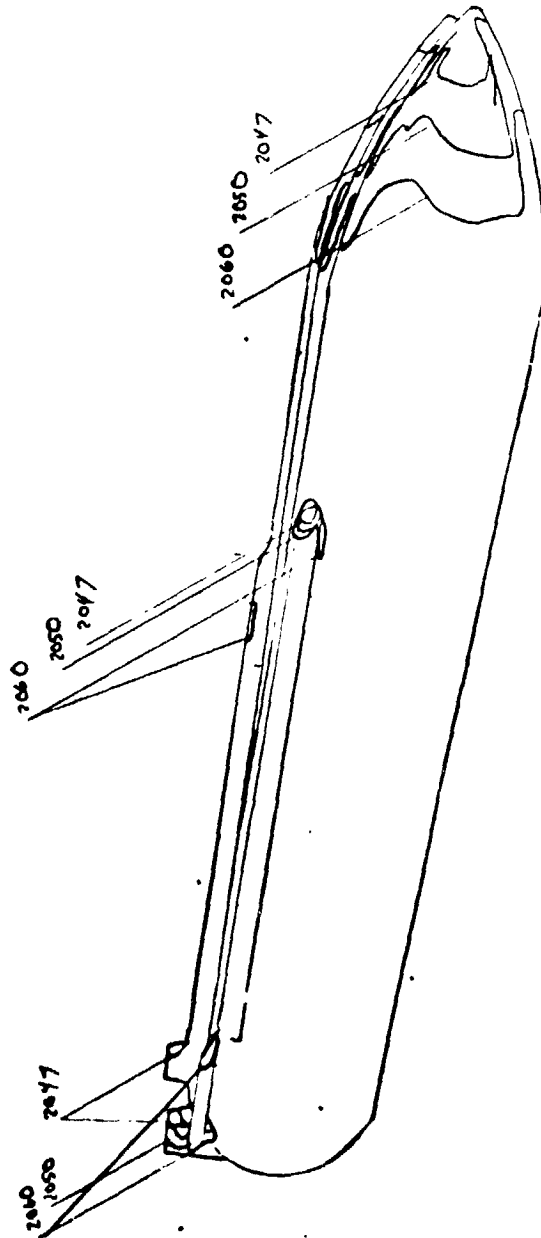
MODEL HAS LEFT CENTERLINE



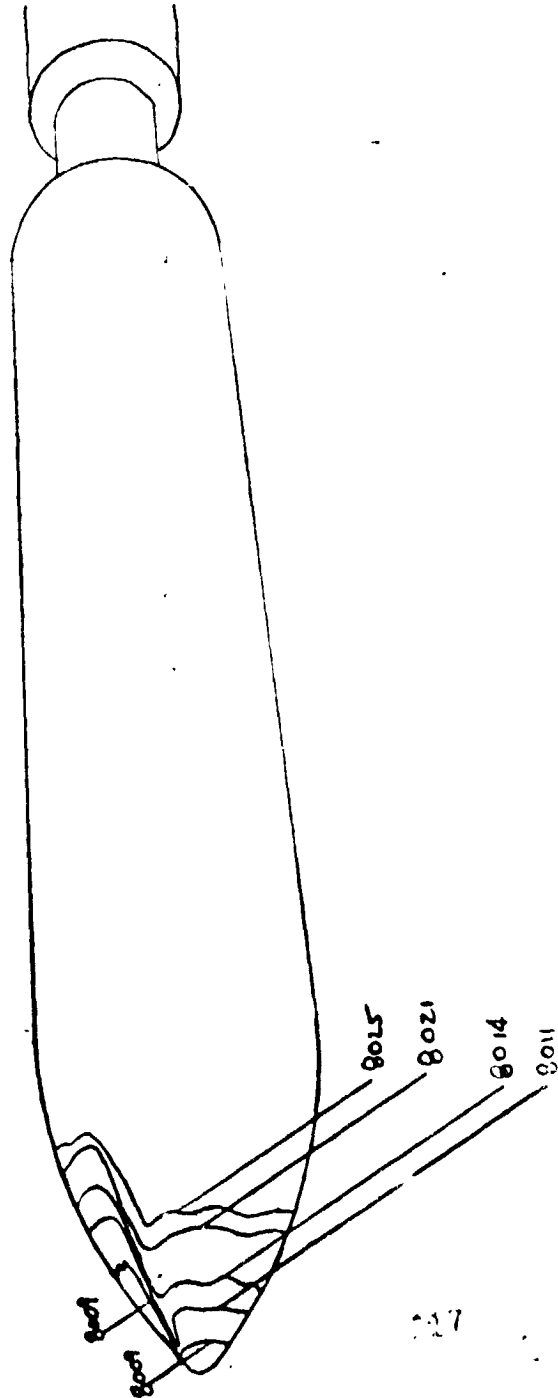
33



8495  
GP 14  
Lower  
Side



8108  
6014  
708

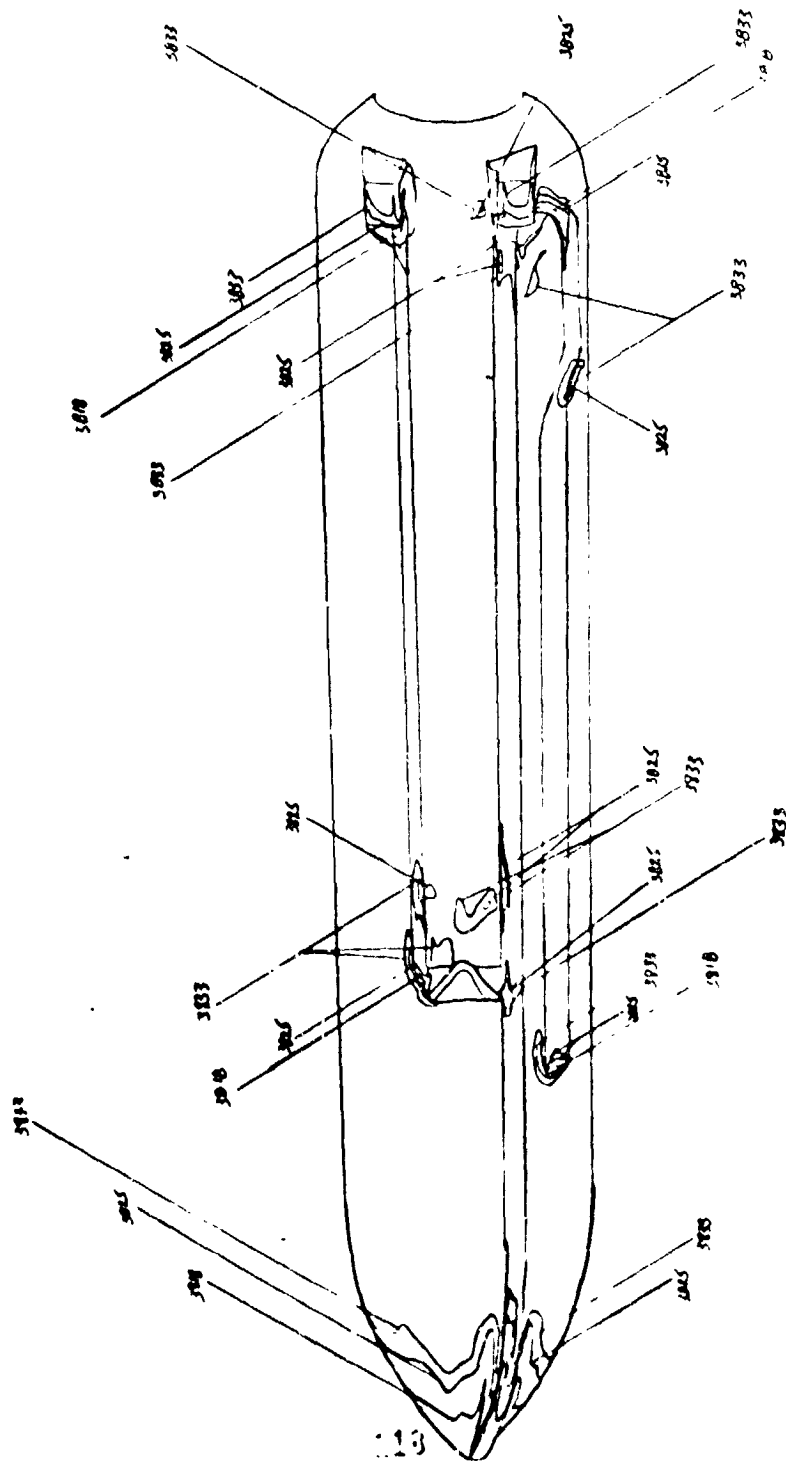


22

227

GP 14

769  
M. E.  
Bohman  
EC-5786 x106  
X0-50  
Tank



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6/29/73

NASA-R1 ORBITER HEATING AECIARO-INC.) ARNOLD AFS, TENNESSEE  
VON KARMAN GAS DYNAMICS FACILITY  
50 INCH HYPERSONIC TUNNEL B  
VA28Q

GROUP CONFID MODEL WACH NO P0(PSTIA) TO(DEG R) ALPH-MODEL ALPHA-SECTOR ALPHA-PREBEND ROLL-MODEL YAW  
14 A TANK A.00 A58.3 1333 -5.03 5.03 0 180.00 -0.06

T-INF P-INF Q-INF V-INF MU-INF RMO-INF MU-INF RF/FT MREF STREF  
(DEG R) (PSIA) (FT/SEC) (SLUGS/FT3) (LP-SEC/FT2) (FT-1) (R= .0175FT) (R= .0175FT)  
96.6 .088 3.939 3857 7.436E-05 7.778E-08 3.783E-06 4.995E-02 2.091E-02

CAMERA ROLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHOXCK) YBAR(10) RETA(10)

TOP(1) 8109 300 80 .0544 0 0

UPPER STRENGTH 8244  
LOWER STRENGTH 8495  
MOTIC(1) 7681

PIC NO TIME DELTIME H(10) H(10)/MREF H(-970) H(-970)/MREF H(-850) H(-850)/MREF ST(10)

T 806(100) 1-10 MODEL HAS NOT REACHED CENTERLINE H(10) MREF H(-970) H(-970)/MREF H(-850) H(-850)/MREF ST(10)  
US 802(100) 1-10 MODEL HAS NOT REACHED CENTERLINE  
M 314(100) 1-10 MODEL HAS NOT REACHED CENTERLINE  
LS 2045(100) 1-10 MODEL HAS NOT REACHED CENTERLINE  
T 807(100) 2-25 MODEL HAS NOT REACHED CENTERLINE  
M 315(100) 2-25 MODEL HAS NOT REACHED CENTERLINE  
LS 2046(100) 2-25 MODEL HAS NOT REACHED CENTERLINE  
US 803(100) 2-25 MODEL HAS NOT REACHED CENTERLINE

INJECT TIME = 2.6P

A 314(100) 3-20 1.07 1.248E-02 .2432 1.451E-02 .3373 1.924E-02 .3930 5.406E-03  
T 804(100) 3-23 1.07 1.240E-02 .2614 1.640E-02 .3350 1.911E-02 .3903 5.369E-03  
US 804(100) 3-23 1.07 1.240E-02 .2614 1.640E-02 .3350 1.911E-02 .3903 5.369E-03  
T 807(100) 4-41 2.90 1.015E-02 .2073 1.301E-02 .2457 1.515E-02 .3496 4.259E-03  
US 845(100) 4-41 2.90 1.015E-02 .2073 1.301E-02 .2457 1.515E-02 .3496 4.259E-03  
M 317(100) 4-41 2.90 1.015E-02 .2073 1.301E-02 .2457 1.515E-02 .3496 4.259E-03  
LS 2047(100) 4-41 2.90 1.015E-02 .2073 1.301E-02 .2457 1.515E-02 .3496 4.259E-03  
T 801(100) 5-46 3.95 1.645E-03 .1776 1.111E-02 .2276 1.294E-02 .2452 3.645E-03  
US 846(100) 5-46 3.95 1.645E-03 .1776 1.111E-02 .2276 1.294E-02 .2452 3.645E-03  
M 318(100) 5-46 3.95 1.645E-03 .1776 1.111E-02 .2276 1.294E-02 .2452 3.645E-03  
LS 2048(100) 5-46 3.95 1.645E-03 .1776 1.111E-02 .2276 1.294E-02 .2452 3.645E-03  
T 801(100) 6-53 5.03 7.709E-03 .1575 9.890E-03 .2014 1.151E-02 .2451 3.215E-03  
M 317(100) 6-53 5.03 7.709E-03 .1575 9.890E-03 .2014 1.151E-02 .2451 3.215E-03  
LS 2049(100) 6-53 5.03 7.709E-03 .1575 9.890E-03 .2014 1.151E-02 .2451 3.215E-03  
US 847(100) 6-54 5.05 7.647E-03 .1571 9.855E-03 .2014 1.148E-02 .2451 3.215E-03  
M 318(100) 7-61 6.11 6.946E-03 .1429 8.947E-03 .1432 1.045E-02 .2134 2.916E-03  
T 802(100) 7-61 6.11 6.946E-03 .1429 8.947E-03 .1432 1.045E-02 .2134 2.916E-03  
LS 2050(100) 7-61 6.11 6.946E-03 .1429 8.947E-03 .1432 1.045E-02 .2134 2.916E-03

087

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6/29/73

AEDC(ARO, INC.) ARNOLD AFS, TENNESSEE  
VON KARMAN GAS DYNAMICS FACILITY  
50 INCH HYPERSONIC TUNNEL R

NASA-R1 ORBITER HEATING

V4249

GROUP	CONFID	MODEL	WACH	NO	PO(PSIA)	TO(PSIA)	ALPHA-MODEL	ALPHA-SECTOR	ALPHA-PREHEND	ROLL-MODEL	YAW
1A	9	TANK	8.00	1333	ASR.2	1333	-5.03	5.03	0	180.00	-0.00
T-INF	P-INF	Q-INF	V-INF	RMQ-INF	MU-INF	RF/FT	MREF	STREF			
(DEG R)	(PSIA)	(PSIA)	(FT/SFC)	(SLUGS/FT3)	(LB-SEC/FT3)	(FT-1)	(R= .0175FT)	(R= .0175FT)			
94.6	.088	3.938	3852	7.637E-05	7.776E-05	3.784E-05	4.995E-02	2.091E-02			
CAMERA	ROLL NO	PAINT TEMP (DEG F)	INITIAL TEMP (DEG F)	SQUARE ROOT (RHO/CXK)	TRANSITO	BETA(10)					
TOP(1)	810R										
UPPER SINE(US)	824A	300	20	.0544	2.774E-01	3.1777E-01					
LOWER SINE(LS)	8495										
NOIT(MIN)	7601										

PIC NO	TIME DELTIME	M(101)	M(101)/MREF	M(.910)	M(.910)/MREF	M(.85010)	M(.85010)/MREF	ST(10)
US 3421(100)	7.63	6.92E-03	.1426	8.94E-03	.1828	1.043E-02	.2130	2.929E-03
M 3421(100)	8.66	6.46E-03	.1320	8.24E-03	.1692	9.649E-03	.1971	2.712E-03
T 4013(100)	6.68	6.451E-03	.1314	8.247E-03	.1689	9.632E-03	.1968	2.708E-03
US 4051(100)	6.68	6.451E-03	.1314	8.247E-03	.1689	9.632E-03	.1968	2.708E-03
LS 2452(100)	8.68	6.451E-03	.1314	8.247E-03	.1689	9.632E-03	.1968	2.708E-03
M 3421(100)	9.74	6.025E-03	.1229	7.722E-03	.1577	8.996E-03	.1838	2.524E-03
T 4013(100)	9.76	6.014E-03	.1229	7.710E-03	.1575	8.983E-03	.1835	2.524E-03
US 4051(100)	9.76	6.014E-03	.1229	7.710E-03	.1575	8.983E-03	.1835	2.524E-03
LS 2452(100)	9.76	6.014E-03	.1229	7.710E-03	.1575	8.983E-03	.1835	2.524E-03
T 4013(100)	10.84	5.654E-03	.1156	7.252E-03	.1441	8.449E-03	.1726	2.374E-03
US 4051(100)	10.84	5.654E-03	.1156	7.252E-03	.1441	8.449E-03	.1726	2.374E-03
M 3421(100)	10.84	5.654E-03	.1156	7.252E-03	.1441	8.449E-03	.1726	2.374E-03
LS 2452(100)	10.84	5.654E-03	.1156	7.252E-03	.1441	8.449E-03	.1726	2.374E-03
T 4013(100)	11.89	5.364E-03	.1094	6.875E-03	.1404	8.010E-03	.1636	2.251E-03
US 4051(100)	11.89	5.364E-03	.1094	6.875E-03	.1404	8.010E-03	.1636	2.251E-03
LS 2452(100)	11.89	5.364E-03	.1094	6.875E-03	.1404	8.010E-03	.1636	2.251E-03
T 4013(100)	12.56	5.144E-03	.1042	6.447E-03	.1336	7.625E-03	.1557	2.141E-03
US 4051(100)	12.56	5.144E-03	.1042	6.447E-03	.1336	7.625E-03	.1557	2.141E-03
LS 2452(100)	12.56	5.144E-03	.1042	6.447E-03	.1336	7.625E-03	.1557	2.141E-03
T 4013(100)	12.56	5.144E-03	.1042	6.447E-03	.1336	7.625E-03	.1557	2.141E-03
US 4051(100)	12.56	5.144E-03	.1042	6.447E-03	.1336	7.625E-03	.1557	2.141E-03
LS 2452(100)	12.56	5.144E-03	.1042	6.447E-03	.1336	7.625E-03	.1557	2.141E-03
T 4013(100)	13.07	4.877E-03	.0994	6.251E-03	.1277	7.283E-03	.1488	2.046E-03
US 4051(100)	13.07	4.877E-03	.0994	6.251E-03	.1277	7.283E-03	.1488	2.046E-03
LS 2452(100)	13.07	4.877E-03	.0994	6.251E-03	.1277	7.283E-03	.1488	2.046E-03

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**SECRET**

AEOCIARO, INC.) ARNOLD AFS, TENNESSEE  
VON KARMAN GAS DYNAMICS FACILITY  
50 INCH HYPERSONIC TUNNEL 9

51/62/3

GROUP	CONFID	MODEL	MACH NO	POT(PSTAI)	Y0(DEG R)	ALPHA-MODEL	ALPHA-SECTION	ALPHA-PREBEND	ROLL-MODEL	YAW
14	8	TANK	A.00	858.3	1333	-5.03	5.03	0	180.00	-0.00
		T-INF	P-INF	Q-INF	V-INF	RMO-INF	WU-INF	RE/FT	MREF	STREF
		(DEG M)	(PSTAI)	(PSTAI)	(FT/SEC)	(SLUGS/FT3)	(LB-SEC/FT2)	(FT-I)	(R=	(M=
		96.4	-0.0E	3.019	3852	7.439E-05	7.775E-08	3.745E 05	4.405E-02	2.031E-02
		CAMERA	ROLL NO	PAINT TEMP (DEG F)	INITIAL TEMP (DEG F)	SQUARE ROOT (RMO/CAK)	TRAR(TO)	BETA(TO)		
		-OPT(1)	8104							
		UPPER TIME(US)	8244							
		LOWER TIME(US)	8495							
		MOTIC(M)	7641							

PIC NO	TYPE DELTIME	M(TO)	M(TO)/MREF	M(.9TO)	M(.9TO)/MREF	M(.9TO)/MREF	ST(10)
	21-57						
US A06170m1	21-57	20-87	MODEL WAS LEFT CENTERLINE 1.859E-03	.078A	6.945E-03	.1177	1.619E-03

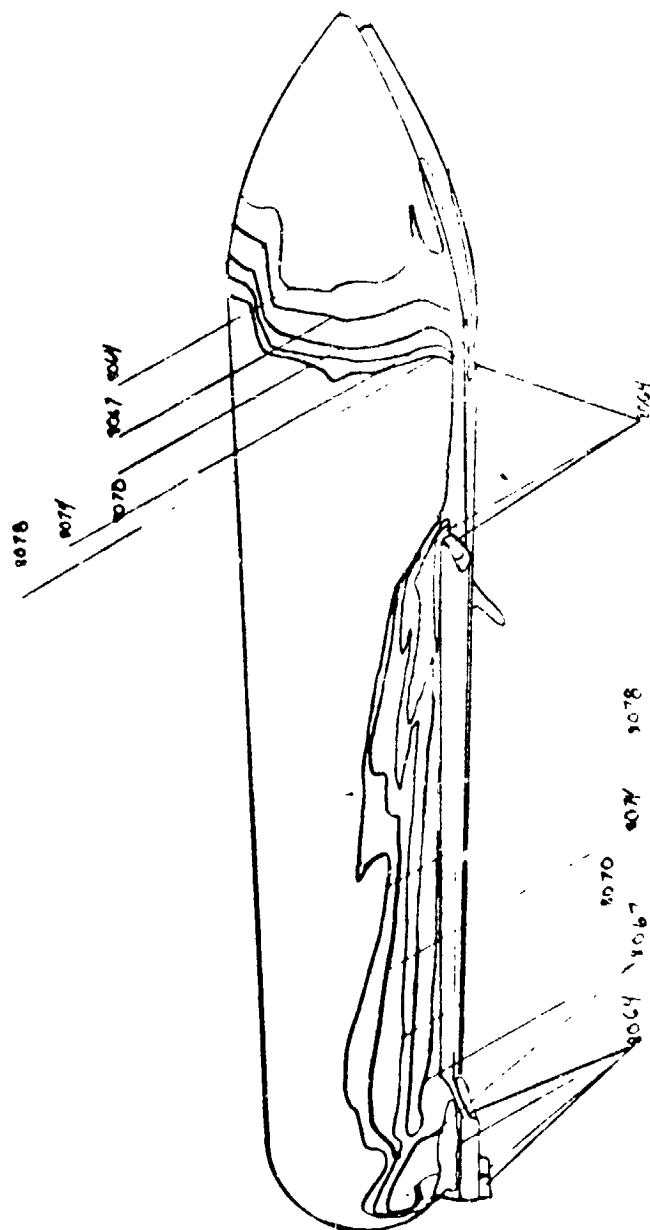
22

292

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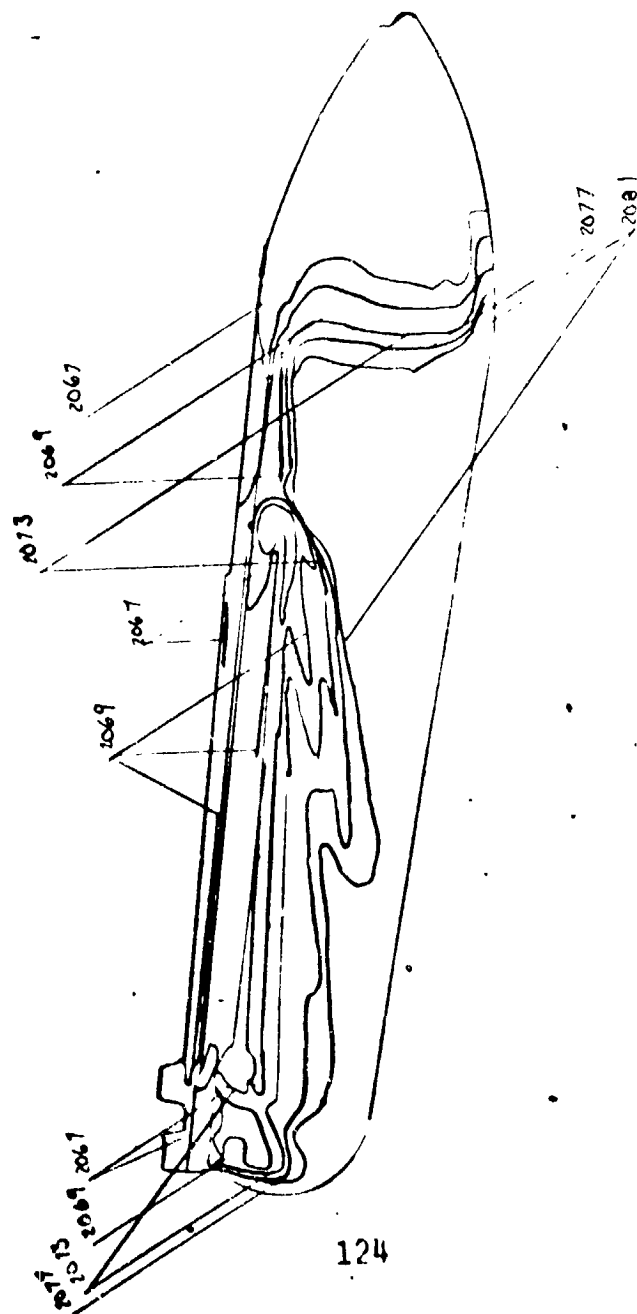
8244  
GP 15  
Upper Side

MDS



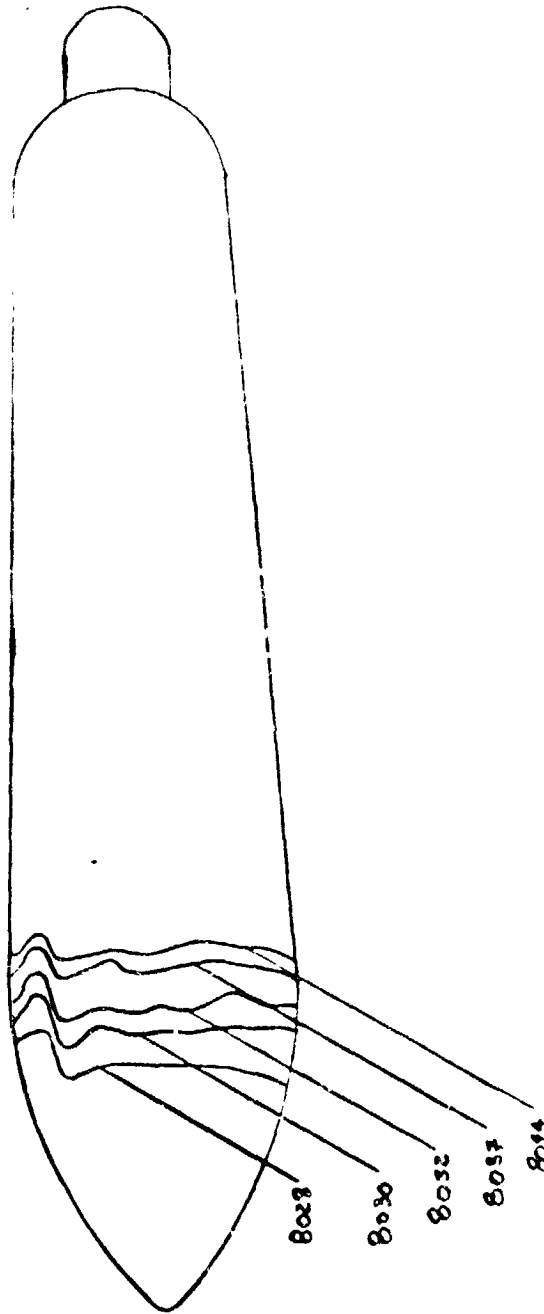


849 S  
G1215



8108  
8015  
TOP

22



125

1





6/29/73

MECICARO, INC.) ARNOLD AFS, TENNESSEE  
VON KARMAN GAS DYNAMICS FACILITY  
50 INCH HYPERSONIC TUNNEL #

INCH HYPERSONIC TUNNEL B

Y-TAF	P-INP	Q-INP	V-INP	RMO-INP	MU-INP	RF/FT	MREF	STREF
(DEG R)	(PSIA)	(PSIA)	(FT/SEC)	(SLUGS/FT)	(LB-SEC/FT <sup>2</sup> )	(FT-1)	(R <sub>z</sub> .01)/SFT)	(R <sub>z</sub> .0175FT)
15	8	TANK	MACH NO	PO(P(SIA)	TO( DEG R)	ALPHA-MODEL	ALPHA-SECTOR	ALPHA-PREBEND
			8.00	859.6	134.7	-5.02	5.02	0

TOP(T)	8109	80	6.320E-1
WPPF SIN(US)	9244	131	.0486

392

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6/29/73

NASA-RI ORBITER HEATING

VA299

AEDC(ARQ,INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL R

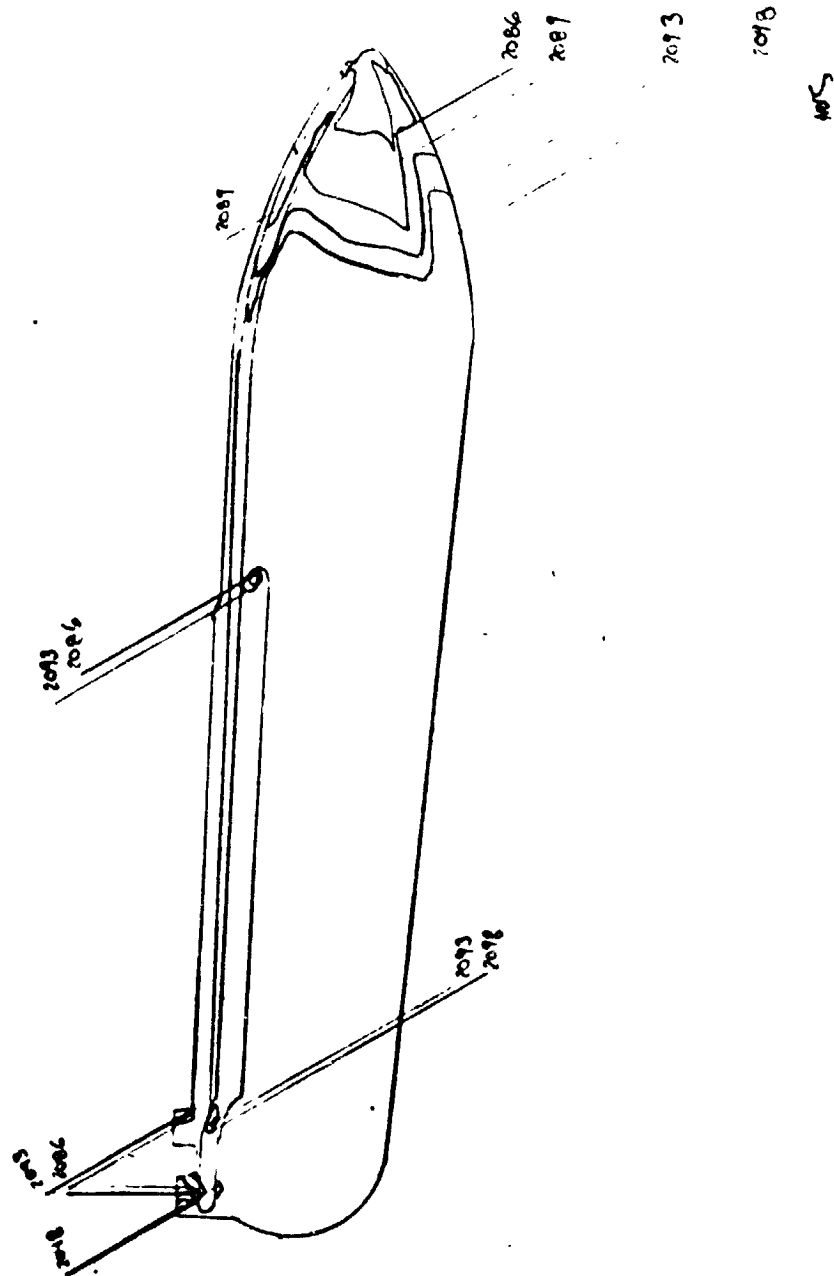
GROUP	CONFIG	MODEL	TANK	MACH NO	PO(PSIA)	TO(DEG R)	ALPHA-MODEL	ALPHA-SECTOR	ALPHA-PREBEND	ROLL-MODEL	YAW
15	R			8.00	859.5	1347	-5.02	5.02	0	180.00	-0.00
T-INF	Q-TNF	Q-INF	V-INF	RMO-INF	MO-INF	RF/FT	STREF				
(DEG R)	(PSIA)	(PSIA)	(FT/SEC)	(SLUGS/FT3)	(LB-SEC/FT2)	(FT-1)	(R= .0175FT)				
97.6	.088	3.944	3873	7.568F-05	7.858F-08	3.730E 06	4.908E-02	2.103E-02			
CAMFRA	ROLL NO	PAINT IFMP	(DEG F)	INITIAL TEMP	(DEG F)	SQUARE ROOT	(RHO*CXK)	TRAR(TO)	RETA(TO)		
TOP(T)	8108			80		.0486					
UPPER SIDE(US)	8244			131				6.320E-02	5.8966E-02		
LOWER SIDE(LS)	8495										
MOTIC(M)	7681										

PIC NO	TIME DELTIME	H(TO)	HREF	H(-9TO)	HREF	H(-85TO)	HREF	ST(TO)
T 9039(131)	15.12	7.767E-04	.0158	9.425E-04	.0192	1.055E-03	.0215	3.299E-04
M 3847(131)	15.12	7.767E-04	.0158	9.425E-04	.0192	1.055E-03	.0215	3.299E-04
LS 2078(131)	15.12	7.767E-04	.0158	9.425E-04	.0192	1.055E-03	.0215	3.299E-04
US 8075(131)	15.14	7.760E-04	.0159	9.416E-04	.0192	1.055E-03	.0215	3.299E-04
T 8030(131)	16.19	7.477E-04	.0152	9.073E-04	.0185	1.015E-03	.0207	3.176E-04
M 3848(131)	16.19	7.477E-04	.0152	9.073E-04	.0185	1.015E-03	.0207	3.176E-04
LS 2079(131)	16.19	7.477E-04	.0152	9.073E-04	.0185	1.015E-03	.0207	3.176E-04
US 8076(131)	16.22	7.471E-04	.0152	9.065E-04	.0185	1.015E-03	.0207	3.176E-04
T 8031(131)	17.27	7.217E-04	.0147	8.758E-04	.0178	9.802E-04	.0200	3.066E-04
M 3849(131)	17.27	7.217E-04	.0147	8.758E-04	.0178	9.802E-04	.0200	3.066E-04
LS 2080(131)	17.27	7.217E-04	.0147	8.758E-04	.0178	9.802E-04	.0200	3.066E-04
US 8077(131)	17.29	7.211E-04	.0147	8.751E-04	.0178	9.794E-04	.0200	3.063E-04
T 8032(131)	18.35	6.943E-04	.0142	8.474E-04	.0173	9.405E-04	.0193	2.967E-04
M 3850(131)	18.35	6.943E-04	.0142	8.474E-04	.0173	9.405E-04	.0193	2.967E-04
LS 2081(131)	18.35	6.943E-04	.0142	8.474E-04	.0173	9.405E-04	.0193	2.967E-04
US 8078(131)	18.37	6.974E-04	.0142	8.467E-04	.0173	9.474E-04	.0193	2.965E-04
MODEL HAS LEFT CENTERLINE								
T 8033(131)	19.42	6.770E-04	.0138	8.215E-04	.0167	9.174E-04	.0187	2.876E-04
US 8079(131)	19.42	6.770E-04	.0138	8.215E-04	.0167	9.174E-04	.0187	2.876E-04
LS 2082(131)	19.42	6.770E-04	.0138	8.215E-04	.0167	9.174E-04	.0187	2.876E-04
T 8034(131)	20.50	6.575E-04	.0134	7.979E-04	.0163	8.930E-04	.0182	2.794E-04
US 8080(131)	20.50	6.575E-04	.0134	7.979E-04	.0163	8.930E-04	.0182	2.794E-04
LS 2083(131)	20.50	6.575E-04	.0134	7.979E-04	.0163	8.930E-04	.0182	2.794E-04
US 8081(131)	20.52	6.571E-04	.0134	7.974E-04	.0162	8.924E-04	.0182	2.791E-04

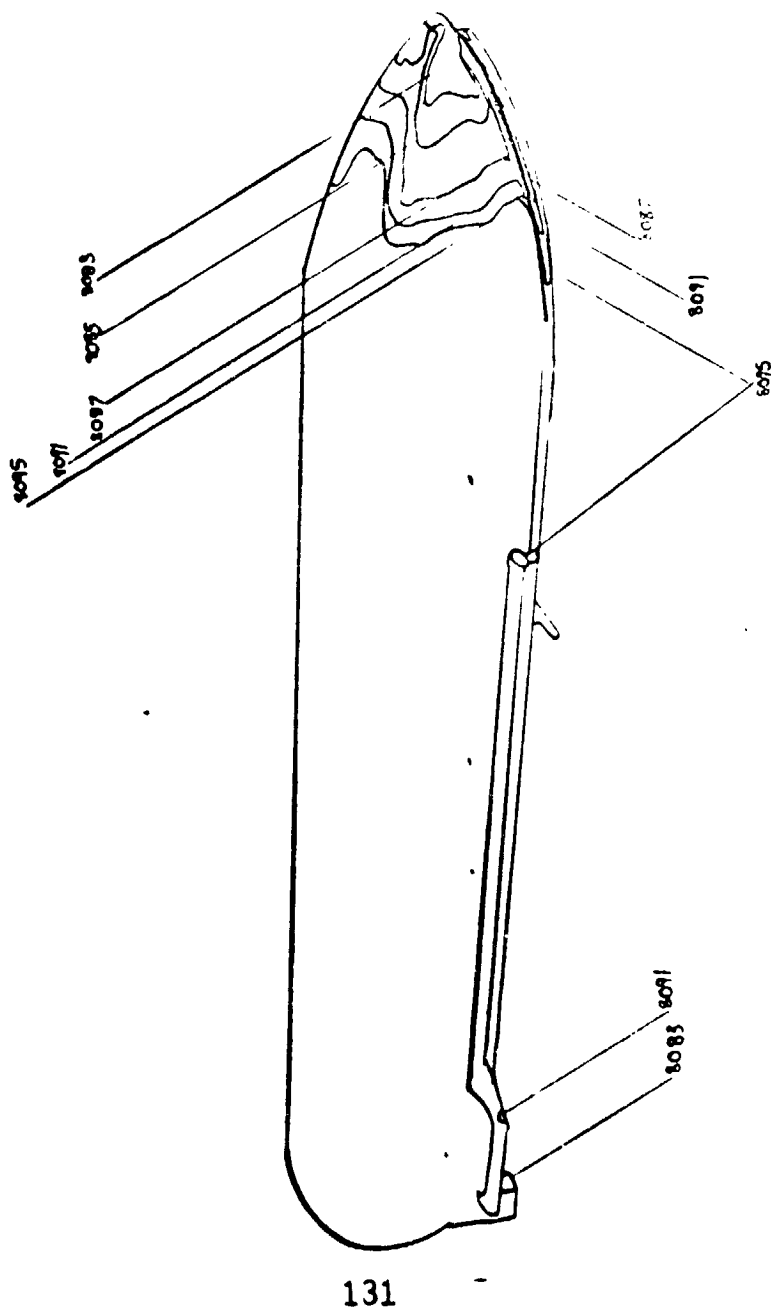
593

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8495  
CP 16  
Lower Side



8244  
GP 16  
Upper Side

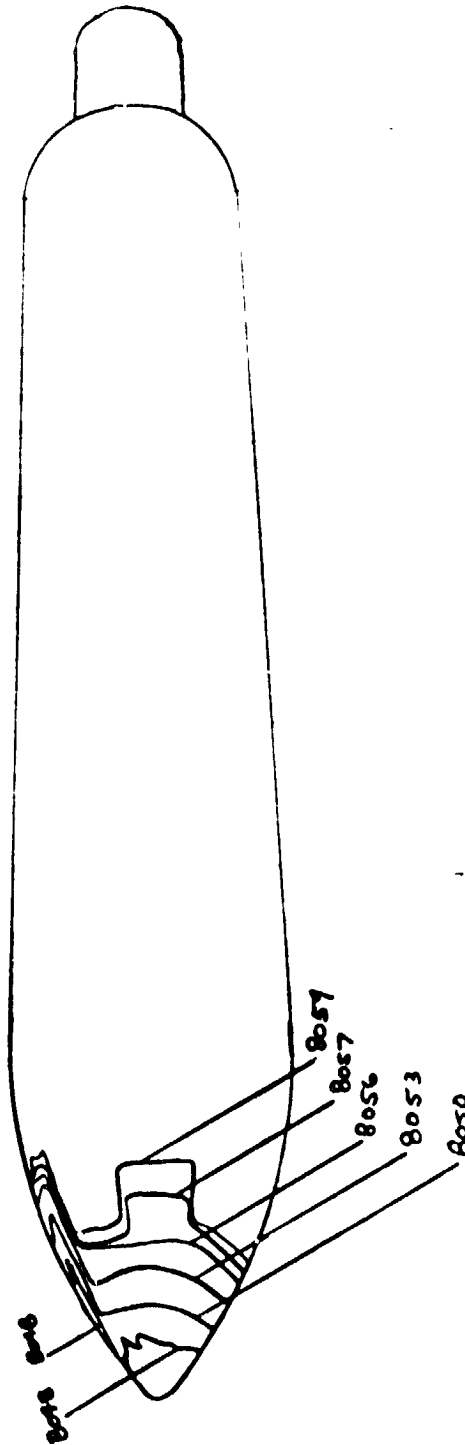


MS



8108  
GP 16  
TOP

22





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6/29/73

NASA-RI ORBITER HEATING

VA289

AEC(ARU, INC.) ARNOLD AFS, TENNESSEE  
 VO, KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL R

GROUP CONFIG MODEL MACH NO PROPSIA TO( DEG R) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREBEND ROLL-MODEL YAW  
 16 P .088 3.939 3060 7.408E-05 1.338 -0.03 .03 0 180.00 -0.00

T-INF P-INF Q-INF V-INF MU-INF MU-INF RE/FT MREF STREF  
 (DEG R) (PSIA) (PSIA) (FT/SEC) (SLUGS/FT) (LR-SEC/FT) (FT-1) (R=.0175FT) (R=.0175FT)

97.0 .088 3.939 3060 7.408E-05 1.338 -0.03 .03 0 180.00 -0.00

CAMERA ROLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RMOCXK) YBAR(10) BETA(10)

TOP(1) 8100 82 0 0

IMPER SINE(US) 8244 300 .0544 0 0

LOWER SINE(LSI) 8495 7681

PIC NO TIME DELTIME HITOI HITOI/MREF H1(9TO) H1(85TO) H1(85TO)/MREF ST(10)

1 0045(100) 3.23 1.01 1.258E-02 .2564 1.611E-02 .3248 1.875E-02 .3826 5.284E-03

US 0045(100) 3.23 1.01 1.258E-02 .2564 1.611E-02 .3248 1.875E-02 .3826 5.284E-03

LS 0045(100) 3.23 1.01 1.258E-02 .2564 1.611E-02 .3248 1.875E-02 .3826 5.284E-03

T 0045(100) 4.01 2.00 0.940E-03 .2037 1.278E-02 .2608 1.487E-02 .3035 4.191E-03

US 0045(100) 4.01 2.00 0.940E-03 .2037 1.278E-02 .2608 1.487E-02 .3035 4.191E-03

LS 0045(100) 4.01 2.00 0.940E-03 .2037 1.278E-02 .2608 1.487E-02 .3035 4.191E-03

T 0045(100) 5.01 3.00 0.524E-03 .1740 1.091E-02 .2227 1.270E-02 .2532 3.500E-03

US 0045(100) 5.01 3.00 0.524E-03 .1740 1.091E-02 .2227 1.270E-02 .2532 3.500E-03

LS 0045(100) 5.01 3.00 0.524E-03 .1740 1.091E-02 .2227 1.270E-02 .2532 3.500E-03

T 0045(100) 5.51 4.00 0.477E-03 .1734 0.682E-03 .1976 1.127E-02 .2400 3.176E-03

US 0045(100) 5.51 4.00 0.477E-03 .1734 0.682E-03 .1976 1.127E-02 .2400 3.176E-03

LS 0045(100) 5.51 4.00 0.477E-03 .1734 0.682E-03 .1976 1.127E-02 .2400 3.176E-03

T 0045(100) 6.56 5.00 0.543E-03 .1539 0.658E-03 .1971 1.124E-02 .2294 3.168E-03

US 0045(100) 6.56 5.00 0.543E-03 .1539 0.658E-03 .1971 1.124E-02 .2294 3.168E-03

LS 0045(100) 6.56 5.00 0.543E-03 .1539 0.658E-03 .1971 1.124E-02 .2294 3.168E-03

T 0045(100) 7.63 6.13 0.806E-03 .1401 0.791E-03 .1794 1.023E-02 .2048 2.883E-03

US 0045(100) 7.63 6.13 0.806E-03 .1401 0.791E-03 .1794 1.023E-02 .2048 2.883E-03

LS 0045(100) 7.63 6.13 0.806E-03 .1401 0.791E-03 .1794 1.023E-02 .2048 2.883E-03

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 6/29/73

# NASA-R1 ORBITER HEATING

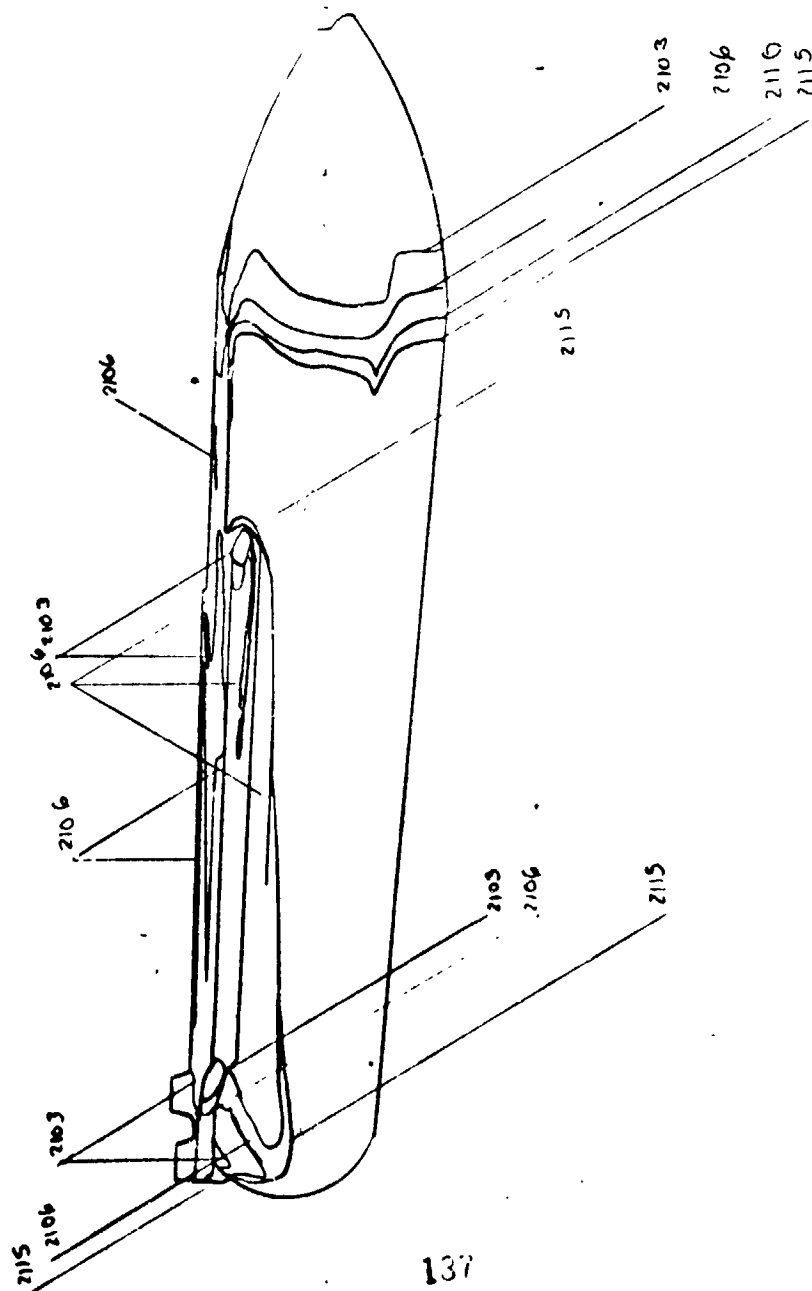
VA200

AEDCI(ARO,INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL A

GROUP	COMPTE	MODEL	TANK	MACH NO	PO(P(SI))	TO(DEG R)	ALPHA-MODEL	ALPHA-SECTOR	ALPHA-PREBEND	ROLL-MODEL	YAW
14				8.00	859.3	1338	-0.03	.03	0	180.00	-0.00
T-1NF P-1NF Q-1NF V-1NF MU-1NF MU-1NF HREF STREF (DEG R) (PSI) (PSI) (FT/SEC) (SLUGS/FT3) (LM-SEC/FT2) (FT-1) (R= .0175FT) (R= .0175FT) 97.0 .000 3.943 3000 7.417E-05 7.806E-08 3.747E 06 4.901E-02 2.095E-02											
CAMERA COLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHOC/CK) TBLR(TO) BETA(TO) TOP(T) 0100 UPPER SIDE(US) 824 LOWER SIDE(LS) 845 HOTTC(H) 7601											

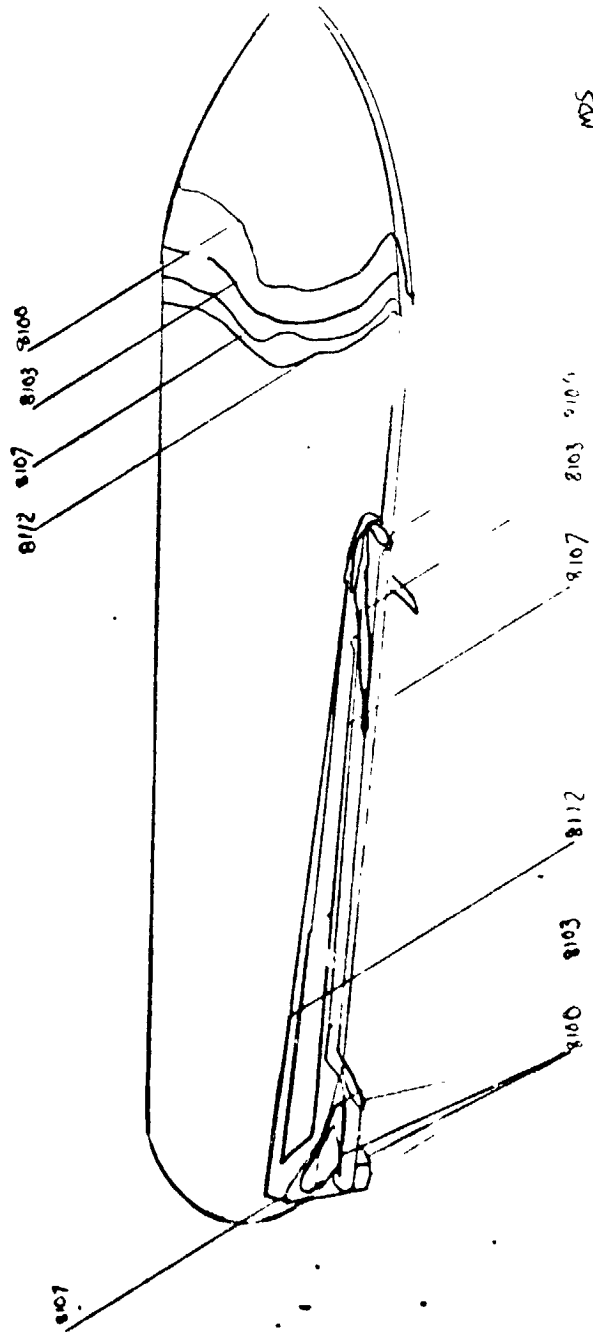
PIC NO	TIME DELTIME	M(TO)	M(TO)/HREF	M(-9TO)	M(-9TO)/HREF	M(-8STO)	M(-8STO)/HREF	ST(TO)
US 0001(100)	3.56	4.821E-03	.0084	6.172E-03	.1259	7.183E-03	.1466	2.024E-03
T 0054(100)	14.59	4.629E-03	.0045	5.926E-03	.1209	6.898E-03	.1408	1.943E-03
M 2066(100)	14.59	4.629E-03	.0045	5.926E-03	.1209	6.898E-03	.1408	1.943E-03
LS 2097(100)	14.59	4.629E-03	.0045	5.926E-03	.1209	6.898E-03	.1408	1.943E-03
US 0004(100)	15.02	4.625E-03	.0044	5.921E-03	.1108	6.891E-03	.1406	1.942E-03
T 0059(100)	16.07	4.625E-03	.0044	5.921E-03	.1164	6.834E-03	.1354	1.870E-03
M 2067(100)	16.07	4.625E-03	.0044	5.921E-03	.1164	6.834E-03	.1354	1.870E-03
LS 2094(100)	16.07	4.625E-03	.0044	5.921E-03	.1164	6.834E-03	.1354	1.870E-03
US 0005(100)	16.00	4.651E-03	.0044	5.968E-03	.1163	6.832E-03	.1353	1.868E-03
MODEL WAS LEFT CENTERLINE								
T 0060(100)	17.14	4.249E-03	.0077	5.504E-03	.1123	6.406E-03	.1307	1.804E-03
M 2068(100)	17.14	4.249E-03	.0077	5.504E-03	.1123	6.406E-03	.1307	1.804E-03
LS 2096(100)	17.14	4.249E-03	.0077	5.504E-03	.1123	6.406E-03	.1307	1.804E-03
US 0006(100)	17.17	4.249E-03	.0077	5.504E-03	.1122	6.400E-03	.1306	1.803E-03
T 0061(100)	18.22	4.118E-03	.0048	5.324E-03	.1086	6.194E-03	.1244	1.745E-03
M 2069(100)	18.22	4.118E-03	.0048	5.324E-03	.1086	6.194E-03	.1244	1.745E-03
LS 2100(100)	18.22	4.118E-03	.0048	5.324E-03	.1086	6.194E-03	.1244	1.745E-03
US 0007(100)	18.25	4.145E-03	.0048	5.320E-03	.1085	6.191E-03	.1263	1.744E-03

8445  
6P 17  
Lower  
Side



MDS

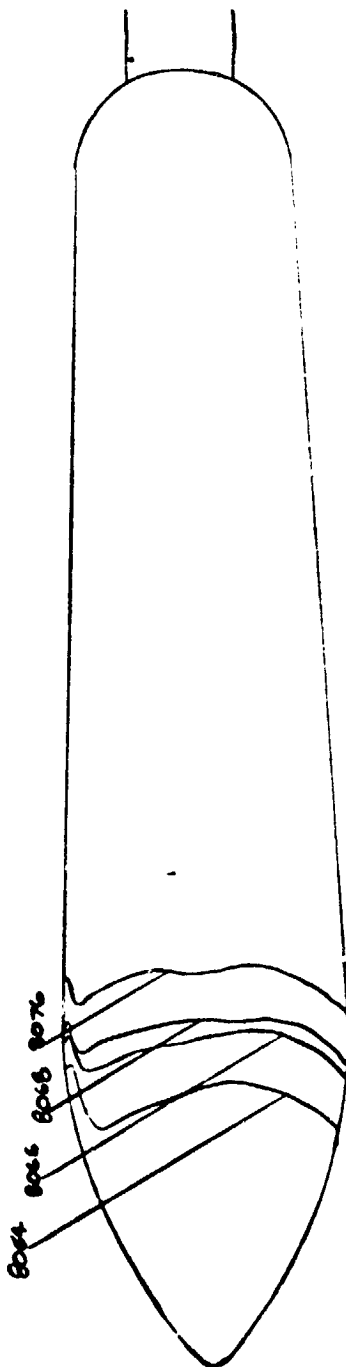
8244  
GP 17  
Upper Side



MDS

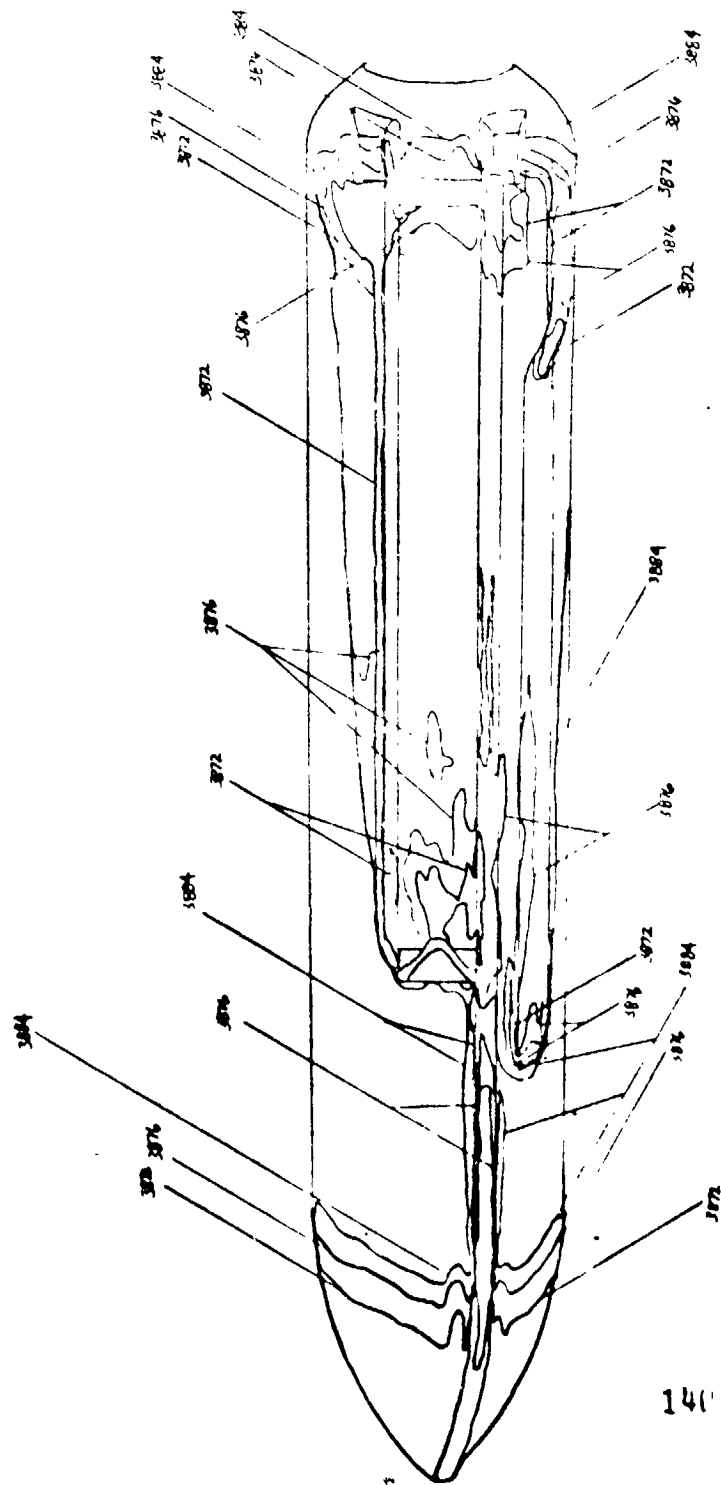
8/08  
GP17  
TOP

CWE





7681  
Bottom  
 $\alpha = 0^\circ$   
Depth 3.742 x 10<sup>6</sup>  
Tank  
M-8  
Op 17



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6/29/73

## MASA-RI ORBITER HEATING

VA289

AEDC(AROTAC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL R

GROUP CONF16 MODEL MACH NO PO(PISA) TO(DEG R) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREBEND ROLL-MODEL YAW  
 17 8 9.00 458.2 1343 -.03 .03 0 180.00 -.00

T-INF P-INF Q-INF V-INF MU-INF RHO-INF RE/FT MREF STREF  
 (DEG R) (PSIA) (PSIA) (FT/SFCL) (SLURS/FT3) (LB-SEC/FT2) (FT-1) (R=.0175FT) (R=.0175FT)  
 97.3 .000 3.938 3867 7.578E-05 7.836E-08 3.740E U6 4.902E-02 2.101E-02

CAVEIRA ROLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SOURCE ROOT (RHOXCKX) TRAR(TO) BETA(TO)  
 TOP(T) 8108 80 .0486 0 0  
 UPPER STONE(US) 8244  
 LOWER STONE(LS) 8495  
 BOTTOM(B) 7681

PTC NO TIME DELT ME H(TO) M(TO)/MREF H(.9TO)/MREF H(.85TO) M(.85TO)/MREF ST(TO)  
 T 8062(131) 1.15 MODEL HAS NOT REACHED CENTERLINE  
 M 3870(131) 1.15 MODEL HAS NOT REACHED CENTERLINE  
 LS 2101(131) 1.15 MODEL HAS NOT REACHED CENTERLINE  
 US 8098(131) 1.25 MODEL HAS NOT REACHED CENTERLINE  
 T 8063(131) 2.23 MODEL HAS NOT REACHED CENTERLINE  
 M 3871(131) 2.23 MODEL HAS NOT REACHED CENTERLINE  
 LS 2102(131) 2.23 MODEL HAS NOT REACHED CENTERLINE  
 US 8099(131) 2.25 MODEL HAS NOT REACHED CENTERLINE

INJECT TIME = 2.68  
 T 8065(131) 3.20 1.80 2.146E-03 .0531 2.917E-03 .0595 9.115E-04  
 M 3872(131) 3.20 1.80 2.146E-03 .0531 2.917E-03 .0595 9.115E-04  
 LS 2103(131) 3.20 1.80 2.146E-03 .0531 2.917E-03 .0595 9.115E-04  
 US 8100(131) 3.23 1.83 2.131E-03 .0528 2.897E-03 .0591 9.051E-04  
 T 8065(131) 4.28 2.88 1.698E-03 .0420 2.308E-03 .0471 7.209E-04  
 M 3873(131) 4.38 2.88 1.698E-03 .0420 2.308E-03 .0471 7.209E-04  
 LS 2104(131) 4.38 2.88 1.698E-03 .0420 2.308E-03 .0471 7.209E-04  
 US 8101(131) 4.41 2.90 1.691E-03 .0418 2.298E-03 .0469 7.180E-04  
 T 8066(131) 5.46 3.95 1.748E-03 .0359 1.969E-03 .0402 6.151E-04  
 M 3874(131) 5.46 3.95 1.748E-03 .0359 1.969E-03 .0402 6.151E-04  
 LS 2105(131) 5.46 3.95 1.748E-03 .0359 1.969E-03 .0402 6.151E-04  
 US 8102(131) 5.48 3.98 1.748E-03 .0357 1.969E-03 .0402 6.151E-04  
 T 8067(131) 6.53 5.03 1.244E-03 .0318 1.745E-03 .0356 5.454E-04  
 M 3875(131) 6.53 5.03 1.244E-03 .0318 1.745E-03 .0356 5.454E-04  
 LS 2106(131) 6.53 5.03 1.244E-03 .0318 1.745E-03 .0356 5.454E-04  
 US 8103(131) 6.56 5.05 1.244E-03 .0317 1.741E-03 .0355 5.441E-04  
 T 8068(131) 7.61 6.11 1.165E-03 .0288 1.584E-03 .0323 4.950E-04  
 M 3876(131) 7.61 6.11 1.165E-03 .0288 1.584E-03 .0323 4.950E-04  
 LS 2107(131) 7.61 6.11 1.165E-03 .0288 1.584E-03 .0323 4.950E-04

097

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NASA-RI ORBITER HEATING

VA289

AEDC(ARO,INC.) ARNOLD AFS, TENNESSEE  
VON KARMAN GAS DYNAMICS FACILITY  
50 INCH HYPERSONIC TUNNEL A

GROUP	CONFIG	MODEL	MACH NO	PO(P/SIA)	TO(IDEG R)	ALPHA-MODEL	ALPHA-SECTOR	ALPHA-PREBEND	ROLL-MODEL	YAW
17	R	TANK	8.00	858.5	1343	-03	.03	0	180.00	-00
T-INF	P-INF	Q-INF	V-INF	RHO-INF	MU-INF	RE/FT	HREF	STREF		
IDEG RI	(P/SIA)	(FT/SEC)	(SLUGS/FT3)	(LB-SEC/FT2)	(FT-1)		(R=.0175FT)	(R=.0175FT)		
97.3	.088	3.940	3867	7.481E-05	7.835E-08	3.742E 06	4.902E-02	2.100E-02		
CAMERA	ROLL NO	PAINT TEMP (DEG F)	INITIAL TEMP (DEG F)	SQUARE ROOT (RHO/CKXK)	TBAR(10)	BETA(10)				
TOP(T)	8108									
UPPER SINE(US)	8244									
LOWER SINE(LS)	8495									
MOTOM(18)	7681									

PIC NO	TIME DELTIME	H(10)/HREF	H(-9TO)	H(-9TO)/HREF	H(-85TO)	H(-85TO)/HREF	ST(10)
US 8104(131)	7.63	6.17	1.411E-03	.0237	1.411E-03	.0237	4.939E-04
T 8069(131)	8.68	7.18	1.304E-03	.0219	1.304E-03	.0219	4.504E-04
H 3877(131)	8.68	7.18	1.304E-03	.0219	1.304E-03	.0219	4.504E-04
LS 2104(131)	8.68	7.18	1.304E-03	.0219	1.304E-03	.0219	4.504E-04
US 8105(131)	8.71	7.21	1.302E-03	.0219	1.302E-03	.0219	4.504E-04
H 3878(131)	9.27	8.23	1.216E-03	.0204	1.216E-03	.0204	4.285E-04
T 8070(131)	9.76	8.24	1.216E-03	.0204	1.216E-03	.0204	4.285E-04
US 8106(131)	9.76	8.24	1.216E-03	.0204	1.216E-03	.0204	4.285E-04
LS 2109(131)	9.76	8.24	1.216E-03	.0204	1.216E-03	.0204	4.285E-04
T 8071(131)	10.81	9.31	1.145E-03	.0193	1.145E-03	.0193	4.009E-04
H 3879(131)	10.81	9.31	1.145E-03	.0193	1.145E-03	.0193	4.009E-04
LS 2110(131)	10.81	9.31	1.145E-03	.0193	1.145E-03	.0193	4.009E-04
US 8107(131)	10.84	9.33	1.042E-03	.0192	1.042E-03	.0192	4.004E-04
T 8072(131)	11.89	10.39	1.042E-03	.0182	1.042E-03	.0182	3.795E-04
H 3880(131)	11.89	10.39	1.042E-03	.0182	1.042E-03	.0182	3.795E-04
LS 2111(131)	11.89	10.39	1.042E-03	.0182	1.042E-03	.0182	3.795E-04
US 8108(131)	11.91	10.41	1.042E-03	.0182	1.042E-03	.0182	3.795E-04
T 8073(131)	12.94	11.44	1.033E-03	.0174	1.033E-03	.0174	3.616E-04
H 3881(131)	12.94	11.44	1.033E-03	.0174	1.033E-03	.0174	3.616E-04
LS 2112(131)	12.94	11.44	1.033E-03	.0174	1.033E-03	.0174	3.616E-04
US 8109(131)	12.96	11.46	1.032E-03	.0173	1.032E-03	.0173	3.612E-04
T 8074(131)	14.02	12.51	9.818E-04	.0166	9.818E-04	.0166	3.456E-04
H 3882(131)	14.02	12.51	9.818E-04	.0166	9.818E-04	.0166	3.456E-04
LS 2113(131)	14.02	12.51	9.818E-04	.0166	9.818E-04	.0166	3.456E-04
US 8110(131)	14.04	12.54	9.818E-04	.0166	9.818E-04	.0166	3.454E-04

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# NASA-RI ORBITER HEATING

VA289

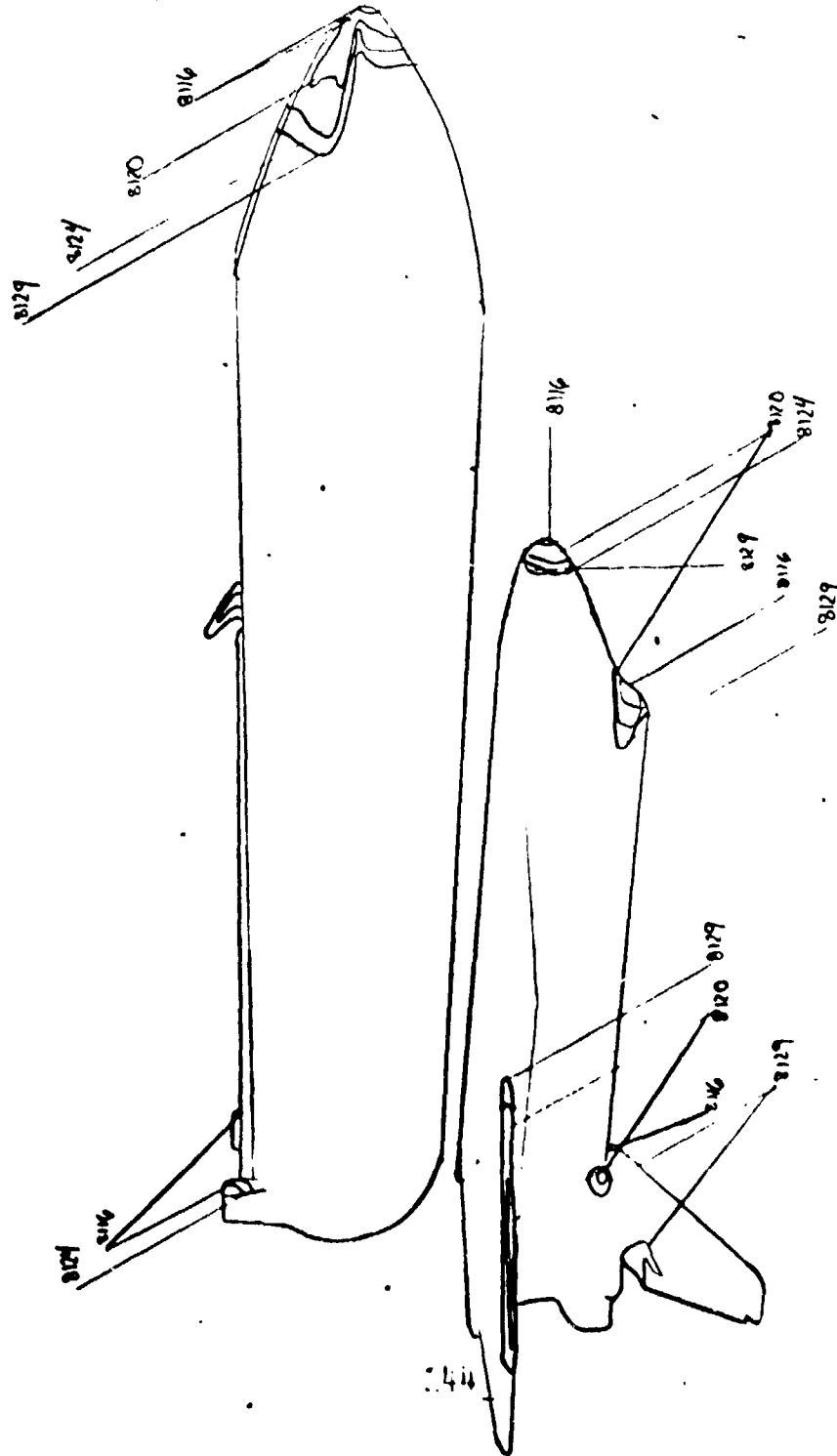
AEDC(AROT, INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL R

GROUP	CONFIG	MODEL	MACH NO	POI(PSIA)	TO(IDEG R)	ALPHA-MODEL	ALPHA-SECTOR	ALPHA-PREBEND	ROLL-MODEL	YAW
17	R	TANK	8.00	858.6	1343	-0.03	.03	0	180.00	-0.00
T-INF	P-INF	Q-INF	V-INF	RHO-INF	MU-INF	RE/FT	HREF	STREF		
(DEG R)	(PSIA)	(FT/SEC)	(SLUGS/FT3)	(LB-SEC/FT2)	(FT-1)	(R= .0175FT)	(R= .0175FT)			
97.3	.088	3.940	3867	7.583E-05	7.835E-08	3.743E 06	4.903E-02	2.100E-02		
CAMERA	ROLL NO	PAINT TEMP (DEG F)	INITIAL TEMP (DEG F)	SQUARE ROOT (RHOXCK)	TBAR(TO)	BETA(TO)				
TOP(T)	8108		80	.0486	6.349E-02	5.9252E-02				
UPPER SINE(US)	8244									
LOWER SINE(LS)	8495									
NOTTOM(B)	7681									

PIC NO	TIME DELTIME	M(TO)	M(TO)/HREF	M(.970)	M(.970)/HREF	M(.85TO)	M(.85TO)/HREF	ST(TO)
T 8075(131)	15.09	7.812E-04	.0159	9.479E-04	.0193	1.062E-03	.0217	3.318E-04
US 8111(131)	15.09	7.812E-04	.0159	9.479E-04	.0193	1.062E-03	.0217	3.318E-04
M 8083(131)	15.09	7.812E-04	.0159	9.479E-04	.0193	1.062E-03	.0217	3.318E-04
LS 2114(131)	15.09	7.812E-04	.0159	9.479E-04	.0193	1.062E-03	.0217	3.318E-04
T 8076(131)	16.14	7.526E-04	.0154	9.132E-04	.0186	1.023E-03	.0209	3.198E-04
M 3884(131)	16.14	7.526E-04	.0154	9.132E-04	.0186	1.023E-03	.0209	3.198E-04
US 8112(131)	16.17	7.520E-04	.0153	9.124E-04	.0186	1.022E-03	.0209	3.196E-04
LS 2115(131)	16.17	7.520E-04	.0153	9.124E-04	.0186	1.022E-03	.0209	3.196E-04
MODEL HAS LEFT CENTERLINE								
T 8077(131)	17.22	7.264E-04	.0148	8.814E-04	.0180	9.873E-04	.0201	3.085E-04
M 3885(131)	17.22	7.264E-04	.0148	8.814E-04	.0180	9.873E-04	.0201	3.085E-04
US 2116(131)	17.22	7.264E-04	.0148	8.814E-04	.0180	9.873E-04	.0201	3.085E-04
LS 2117(131)	17.24	7.258E-04	.0148	8.807E-04	.0180	9.865E-04	.0201	3.083E-04

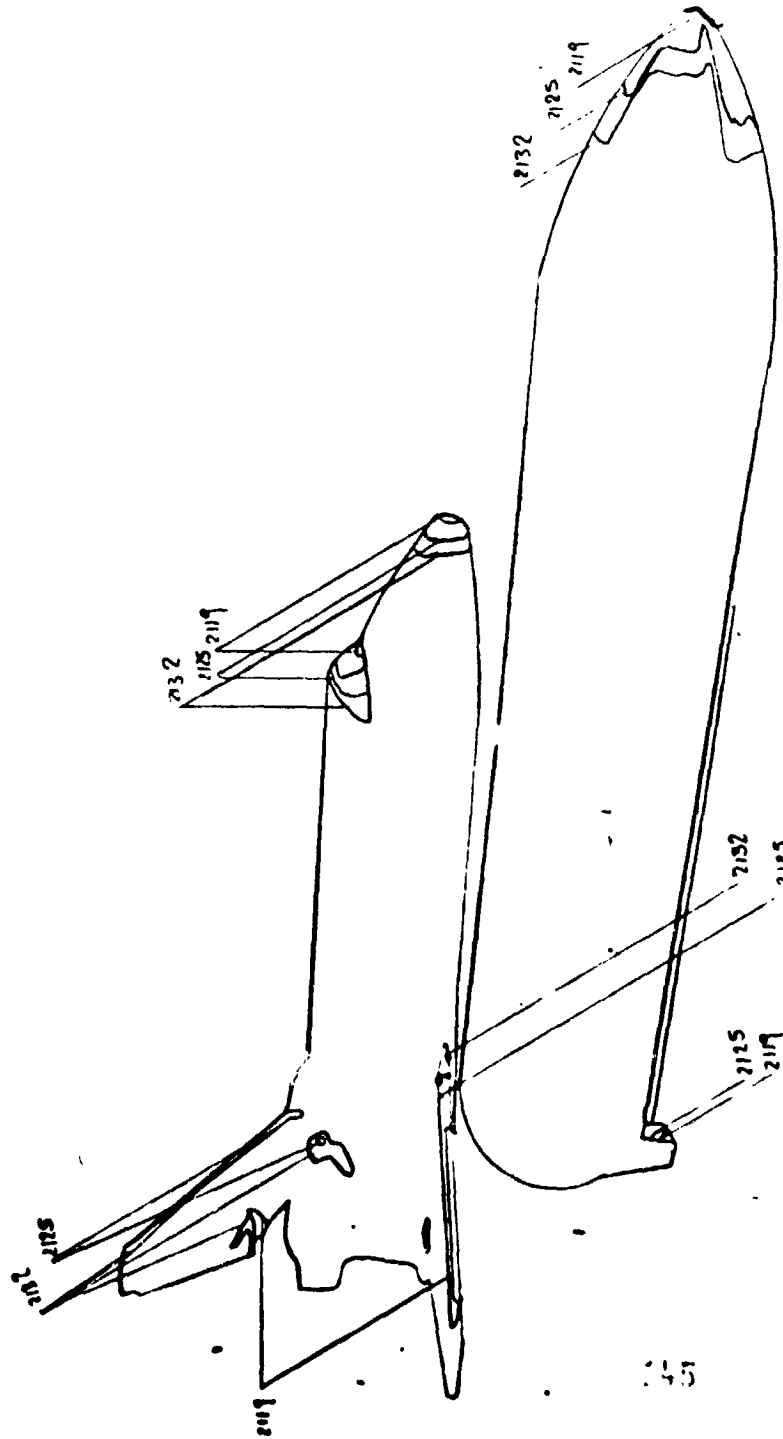
143

82114  
GP 18  
Upper Side



500

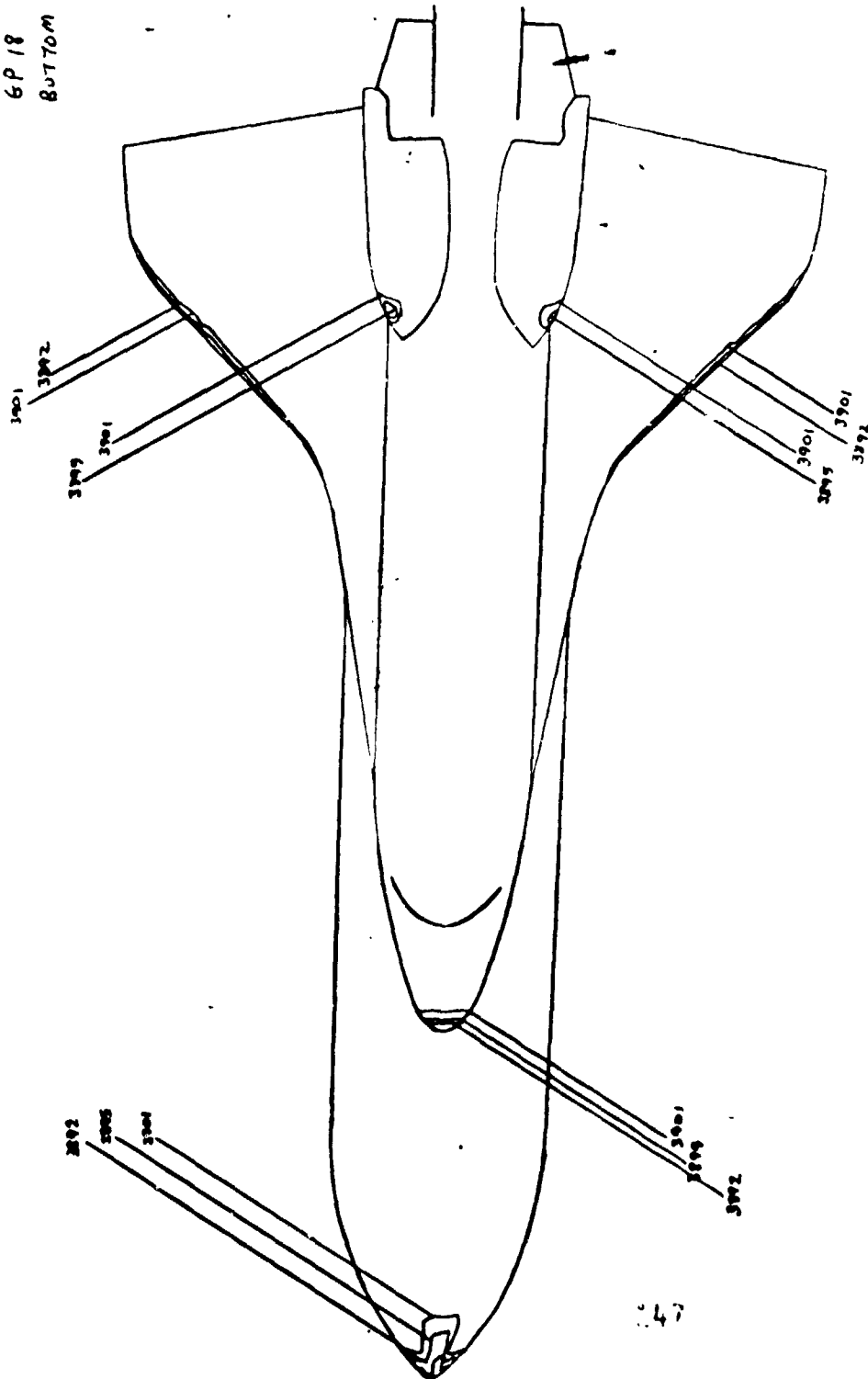
8495  
GP18



105



7681  
6P 18  
BOTTOM



9.2.



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 6/20/73

AEDC(ARO, INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL R

MASA-RI ORBITER HEATING  
 V4244

GROUP CONFIG MODEL MACH NO PO(PSIA) TO(DEG R) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREBEND ROLL-MODEL YAW  
 10 1 1 4.00 858.0 1342 -.02 -.02 0 180.00 -.00  
 T-1AF P-1AF Q-1AF V-1AF RMO-1AF MU-1AF RE/FT MREF STREF  
 IDEG RI (PSIA) (PSIA) (FT/SEC) (LBS-SEC/FT<sup>2</sup>) (LBS-SEC/FT<sup>2</sup>) (FT-1) (R= .0175FT) (R= .0175FT)  
 97.2 .088 3.937 3865 7.545E-05 7.827E-08 3.745E 0A 4.900E-02 2.100E-02  
 CAMERA ROLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHOXCK) THAR(TOI) BETA(TOI)  
 TOP(T) 8108  
 UPPER STOE(US) 8244  
 LOWER STOE(LS) 8495  
 MOTCH(M) 7681  
 400 80 .9555 0 0

TIME DELTME H(TOI) M(TOI)/MREF H(.9TOI) H(.9TOI)/REF H(.85TOI) H(.85TOI)/MREF ST(TOI)  
 P.L. NO  
 T 1078(400) 1.15 2.142E-02 .4453 2.940E-02 .6001 3.569E-02 .7285 9.136E-03  
 M 1078(400) 1.15 2.142E-02 .4453 2.940E-02 .6001 3.569E-02 .7285 9.136E-03  
 LS 2117(400) 1.15 2.142E-02 .4453 2.940E-02 .6001 3.569E-02 .7285 9.136E-03  
 US 2117(400) 1.15 2.142E-02 .4453 2.940E-02 .6001 3.569E-02 .7285 9.136E-03  
 T 1078(400) 1.18 2.142E-02 .4453 2.940E-02 .6001 3.569E-02 .7285 9.136E-03  
 M 1078(400) 1.18 2.142E-02 .4453 2.940E-02 .6001 3.569E-02 .7285 9.136E-03  
 LS 2117(400) 1.18 2.142E-02 .4453 2.940E-02 .6001 3.569E-02 .7285 9.136E-03  
 US 2117(400) 1.18 2.142E-02 .4453 2.940E-02 .6001 3.569E-02 .7285 9.136E-03  
 T 1078(400) 2.23 2.142E-02 .4453 2.940E-02 .6001 3.569E-02 .7285 9.136E-03  
 M 1078(400) 2.23 2.142E-02 .4453 2.940E-02 .6001 3.569E-02 .7285 9.136E-03  
 LS 2117(400) 2.23 2.142E-02 .4453 2.940E-02 .6001 3.569E-02 .7285 9.136E-03  
 US 2117(400) 2.23 2.142E-02 .4453 2.940E-02 .6001 3.569E-02 .7285 9.136E-03  
 T 1078(400) 2.25 2.142E-02 .4453 2.940E-02 .6001 3.569E-02 .7285 9.136E-03  
 M 1078(400) 2.25 2.142E-02 .4453 2.940E-02 .6001 3.569E-02 .7285 9.136E-03  
 LS 2117(400) 2.25 2.142E-02 .4453 2.940E-02 .6001 3.569E-02 .7285 9.136E-03  
 US 2117(400) 2.25 2.142E-02 .4453 2.940E-02 .6001 3.569E-02 .7285 9.136E-03  
 T 1078(400) 2.65 2.142E-02 .4453 2.940E-02 .6001 3.569E-02 .7285 9.136E-03  
 M 1078(400) 2.65 2.142E-02 .4453 2.940E-02 .6001 3.569E-02 .7285 9.136E-03  
 LS 2117(400) 2.65 2.142E-02 .4453 2.940E-02 .6001 3.569E-02 .7285 9.136E-03  
 US 2117(400) 2.65 2.142E-02 .4453 2.940E-02 .6001 3.569E-02 .7285 9.136E-03  
 T 1078(400) 3.30 1.81 2.142E-02 .4453 2.940E-02 .6001 3.569E-02 .7285 9.136E-03  
 M 1078(400) 3.30 1.81 2.142E-02 .4453 2.940E-02 .6001 3.569E-02 .7285 9.136E-03  
 LS 2117(400) 3.30 1.81 2.142E-02 .4453 2.940E-02 .6001 3.569E-02 .7285 9.136E-03  
 US 2117(400) 3.30 1.81 2.142E-02 .4453 2.940E-02 .6001 3.569E-02 .7285 9.136E-03  
 T 1078(400) 3.33 1.84 2.142E-02 .4453 2.940E-02 .6001 3.569E-02 .7285 9.136E-03  
 M 1078(400) 3.33 1.84 2.142E-02 .4453 2.940E-02 .6001 3.569E-02 .7285 9.136E-03  
 LS 2117(400) 3.33 1.84 2.142E-02 .4453 2.940E-02 .6001 3.569E-02 .7285 9.136E-03  
 US 2117(400) 3.33 1.84 2.142E-02 .4453 2.940E-02 .6001 3.569E-02 .7285 9.136E-03  
 T 1078(400) 4.38 2.89 2.142E-02 .4453 2.940E-02 .6001 3.569E-02 .7285 9.136E-03  
 M 1078(400) 4.38 2.89 2.142E-02 .4453 2.940E-02 .6001 3.569E-02 .7285 9.136E-03  
 LS 2117(400) 4.38 2.89 2.142E-02 .4453 2.940E-02 .6001 3.569E-02 .7285 9.136E-03  
 US 2117(400) 4.38 2.89 2.142E-02 .4453 2.940E-02 .6001 3.569E-02 .7285 9.136E-03  
 T 1078(400) 4.41 2.92 2.142E-02 .4453 2.940E-02 .6001 3.569E-02 .7285 9.136E-03  
 M 1078(400) 4.41 2.92 2.142E-02 .4453 2.940E-02 .6001 3.569E-02 .7285 9.136E-03  
 LS 2117(400) 4.41 2.92 2.142E-02 .4453 2.940E-02 .6001 3.569E-02 .7285 9.136E-03  
 US 2117(400) 4.41 2.92 2.142E-02 .4453 2.940E-02 .6001 3.569E-02 .7285 9.136E-03  
 T 1078(400) 4.46 3.97 2.142E-02 .4453 2.940E-02 .6001 3.569E-02 .7285 9.136E-03  
 M 1078(400) 4.46 3.97 2.142E-02 .4453 2.940E-02 .6001 3.569E-02 .7285 9.136E-03  
 LS 2117(400) 4.46 3.97 2.142E-02 .4453 2.940E-02 .6001 3.569E-02 .7285 9.136E-03  
 US 2117(400) 4.46 3.97 2.142E-02 .4453 2.940E-02 .6001 3.569E-02 .7285 9.136E-03  
 T 1078(400) 5.48 3.99 2.142E-02 .4453 2.940E-02 .6001 3.569E-02 .7285 9.136E-03  
 M 1078(400) 5.48 3.99 2.142E-02 .4453 2.940E-02 .6001 3.569E-02 .7285 9.136E-03  
 LS 2117(400) 5.48 3.99 2.142E-02 .4453 2.940E-02 .6001 3.569E-02 .7285 9.136E-03  
 US 2117(400) 5.48 3.99 2.142E-02 .4453 2.940E-02 .6001 3.569E-02 .7285 9.136E-03  
 T 1078(400) 6.51 5.02 2.142E-02 .4453 2.940E-02 .6001 3.569E-02 .7285 9.136E-03  
 M 1078(400) 6.51 5.02 2.142E-02 .4453 2.940E-02 .6001 3.569E-02 .7285 9.136E-03  
 LS 2117(400) 6.51 5.02 2.142E-02 .4453 2.940E-02 .6001 3.569E-02 .7285 9.136E-03  
 US 2117(400) 6.51 5.02 2.142E-02 .4453 2.940E-02 .6001 3.569E-02 .7285 9.136E-03  
 T 1078(400) 6.53 5.04 2.142E-02 .4453 2.940E-02 .6001 3.569E-02 .7285 9.136E-03  
 M 1078(400) 6.53 5.04 2.142E-02 .4453 2.940E-02 .6001 3.569E-02 .7285 9.136E-03  
 LS 2117(400) 6.53 5.04 2.142E-02 .4453 2.940E-02 .6001 3.569E-02 .7285 9.136E-03  
 US 2117(400) 6.53 5.04 2.142E-02 .4453 2.940E-02 .6001 3.569E-02 .7285 9.136E-03  
 T 1078(400) 7.58 6.89 2.142E-02 .4453 2.940E-02 .6001 3.569E-02 .7285 9.136E-03  
 M 1078(400) 7.58 6.89 2.142E-02 .4453 2.940E-02 .6001 3.569E-02 .7285 9.136E-03  
 LS 2117(400) 7.58 6.89 2.142E-02 .4453 2.940E-02 .6001 3.569E-02 .7285 9.136E-03  
 US 2117(400) 7.58 6.89 2.142E-02 .4453 2.940E-02 .6001 3.569E-02 .7285 9.136E-03  
 T 1078(400) 7.58 6.89 2.142E-02 .4453 2.940E-02 .6001 3.569E-02 .7285 9.136E-03  
 M 1078(400) 7.58 6.89 2.142E-02 .4453 2.940E-02 .6001 3.569E-02 .7285 9.136E-03  
 LS 2117(400) 7.58 6.89 2.142E-02 .4453 2.940E-02 .6001 3.569E-02 .7285 9.136E-03  
 US 2117(400) 7.58 6.89 2.142E-02 .4453 2.940E-02 .6001 3.569E-02 .7285 9.136E-03

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6/24/73

NASA-WI ORBITER HEATING

VAZM4

AEDC(ARO-INC-1 ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL #

GROUP CMF16 MODEL MACH NO -0(PSLA) TO(DEG R) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREBEND ROLL-MODEL YAW  
 1 1 0.00 0.00 1242 -0.02 .02 0 180.00 -0.00

T-TAF P-INF Q-INF V-INF RHO-INF MU-INF RF/FY MREF STREF  
 (DEG R) (PSIA) (FT/SEC) (SLUGS/FT<sup>3</sup>) (LB-SEC/FT<sup>2</sup>) (FT-1) (R= .0175FT) (R= .0175FT)  
 97.2 .008 3.942 3865 7.493E-05 7.828E-08 3.749E-06 4.903E-02 2.099E-02

CAMFNA ROLL NO PAINT TFW (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHO/CXK) TRAR(TO) BETA(TO)  
 TOP(1) 8138 80 .0555 3.991E-01 5.2949E-01  
 U/SW SING(US) 8244  
 LOWER SING(LS) 8495  
 MOTTOM(1) 7681

PIC NO	TYPE	DELTIME	M(TO)	M(TO)/MREF	M(-9TO)/MREF	M(-85TO)	M(-85TO)/MREF	ST(1TO)
US 2120(100)	7.61	6.12	1.188E-02	.2423	.3246	1.943E-02	.3964	4.969E-03
LS 2123(100)	7.61	6.12	1.188E-02	.2423	.3246	1.943E-02	.3964	4.969E-03
T 2085(100)	6.66	7.17	1.097E-02	.2239	.3017	1.795E-02	.3663	4.591E-03
M 3093(100)	6.66	7.17	1.097E-02	.2239	.3017	1.795E-02	.3663	4.591E-03
LS 2124(100)	6.66	7.17	1.097E-02	.2239	.3017	1.795E-02	.3663	4.591E-03
US 2121(100)	6.68	7.24	1.096E-02	.2235	.3011	1.792E-02	.3656	4.582E-03
T 2086(100)	9.74	6.25	1.023E-02	.2087	.2813	1.674E-02	.3415	4.280E-03
M 3094(100)	9.74	6.25	1.023E-02	.2087	.2813	1.674E-02	.3415	4.280E-03
LS 2125(100)	9.74	6.25	1.023E-02	.2087	.2813	1.674E-02	.3415	4.280E-03
US 2122(100)	9.76	6.27	1.022E-02	.2084	.2809	1.672E-02	.3409	4.273E-03
T 2087(100)	10.81	9.32	9.624E-03	.1963	.2646	1.575E-02	.3212	4.025E-03
M 3095(100)	10.81	9.32	9.624E-03	.1963	.2646	1.575E-02	.3212	4.025E-03
LS 2126(100)	10.81	9.32	9.624E-03	.1963	.2646	1.575E-02	.3212	4.025E-03
US 2123(100)	10.84	9.34	9.611E-03	.1960	.2642	1.572E-02	.3207	4.019E-03
T 2088(100)	11.69	10.64	9.113E-03	.1858	.2504	1.491E-02	.3040	3.809E-03
M 3096(100)	11.69	10.64	9.113E-03	.1858	.2504	1.491E-02	.3040	3.809E-03
LS 2127(100)	11.69	10.64	9.113E-03	.1858	.2504	1.491E-02	.3040	3.809E-03
US 2124(100)	11.91	10.42	9.102E-03	.1856	.2501	1.489E-02	.3037	3.805E-03
T 2089(100)	12.56	11.48	8.675E-03	.1769	.2384	1.419E-02	.2894	3.625E-03
M 3097(100)	12.56	11.48	8.675E-03	.1769	.2384	1.419E-02	.2894	3.625E-03
LS 2128(100)	12.56	11.48	8.675E-03	.1769	.2384	1.419E-02	.2894	3.625E-03
T 2090(100)	13.74	12.45	8.328E-03	.1698	.2289	1.362E-02	.2779	3.480E-03
M 3098(100)	13.74	12.45	8.328E-03	.1698	.2289	1.362E-02	.2779	3.480E-03
LS 2129(100)	13.74	12.45	8.328E-03	.1698	.2289	1.362E-02	.2779	3.480E-03

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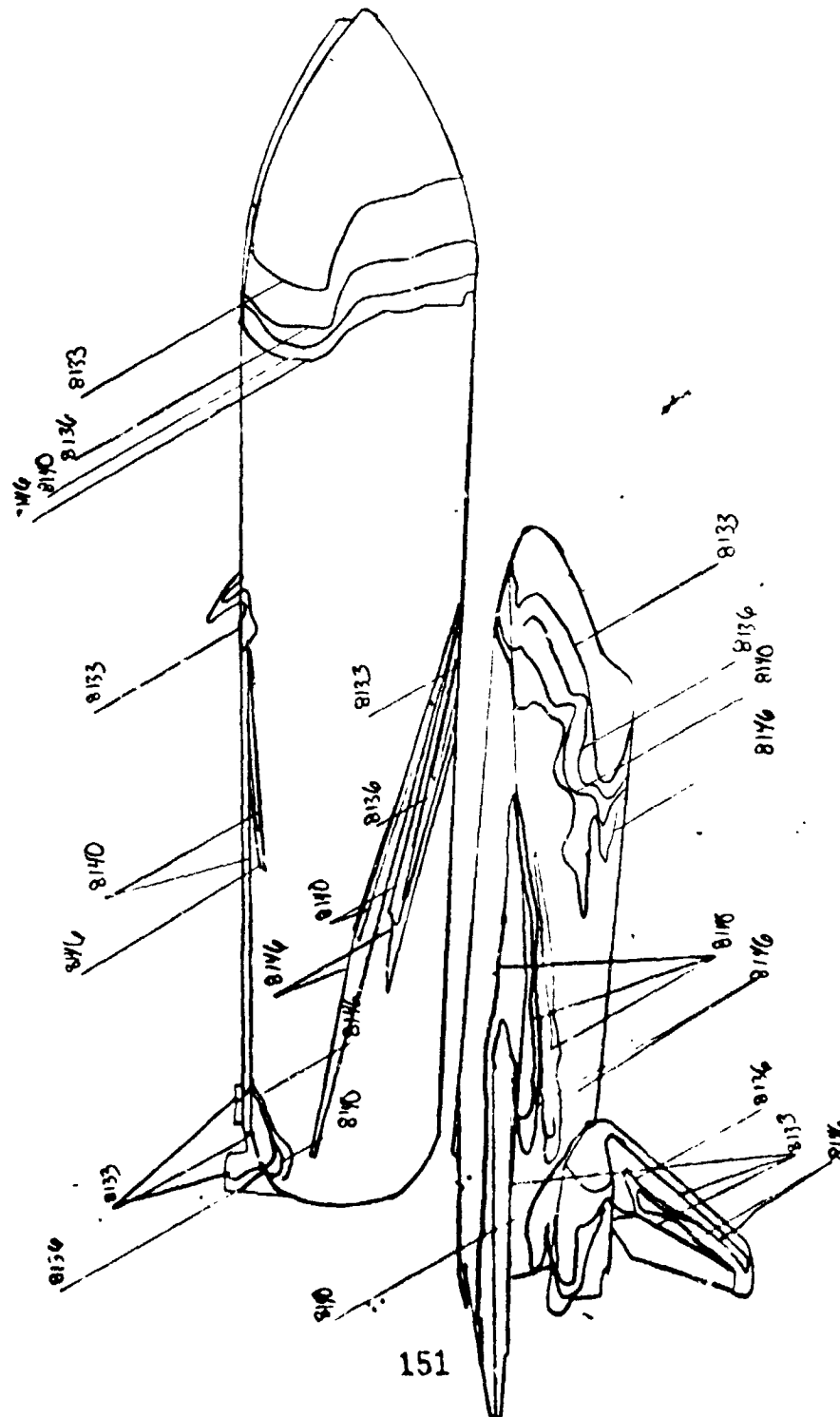
BECCIARDI, INC. 1 ARNOLD AFS, TENNESSEE  
VON KARMAN GAS DYNAMICS FACILITY  
50 INCH HYPERSONIC TUNNEL A

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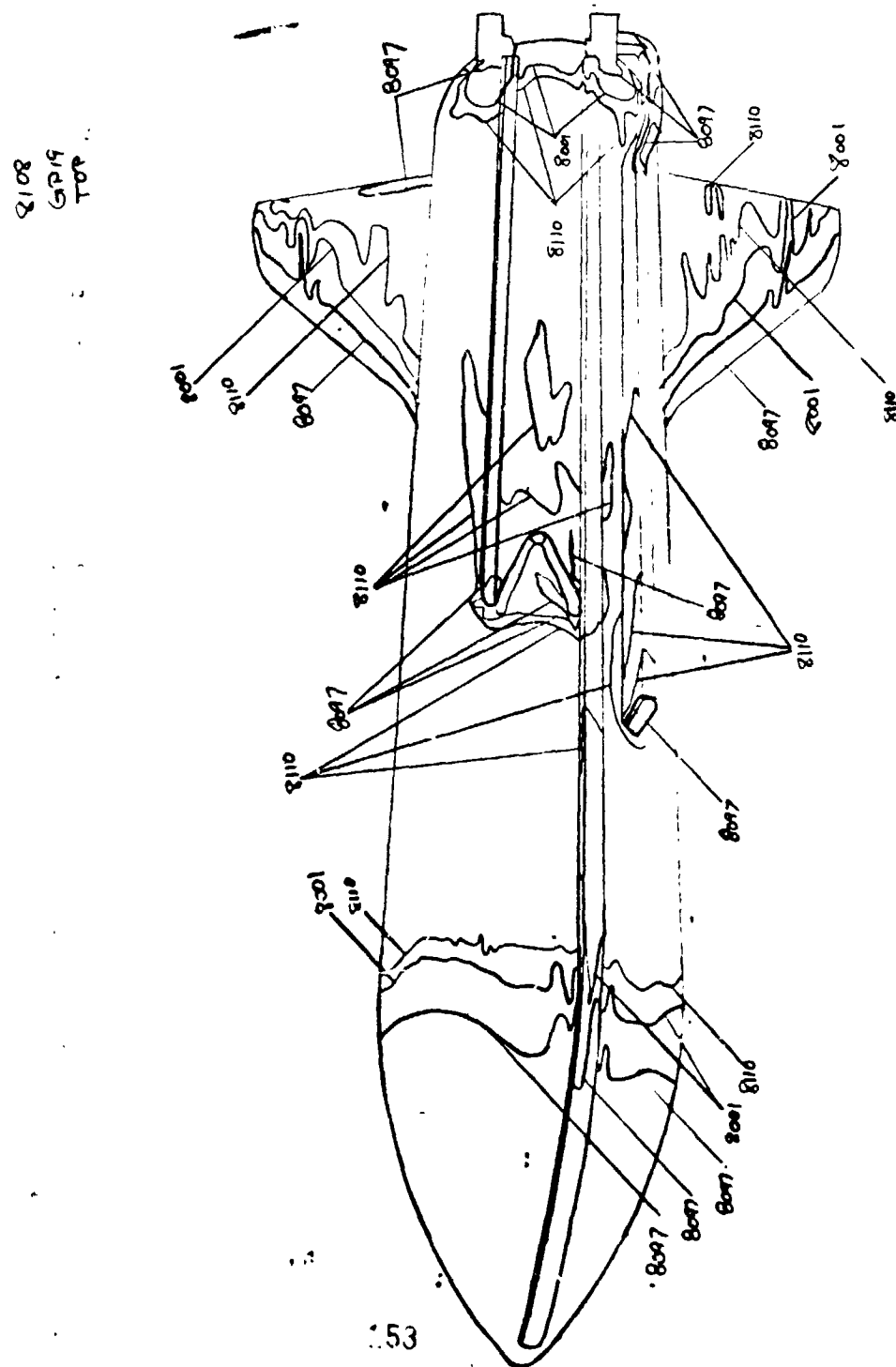
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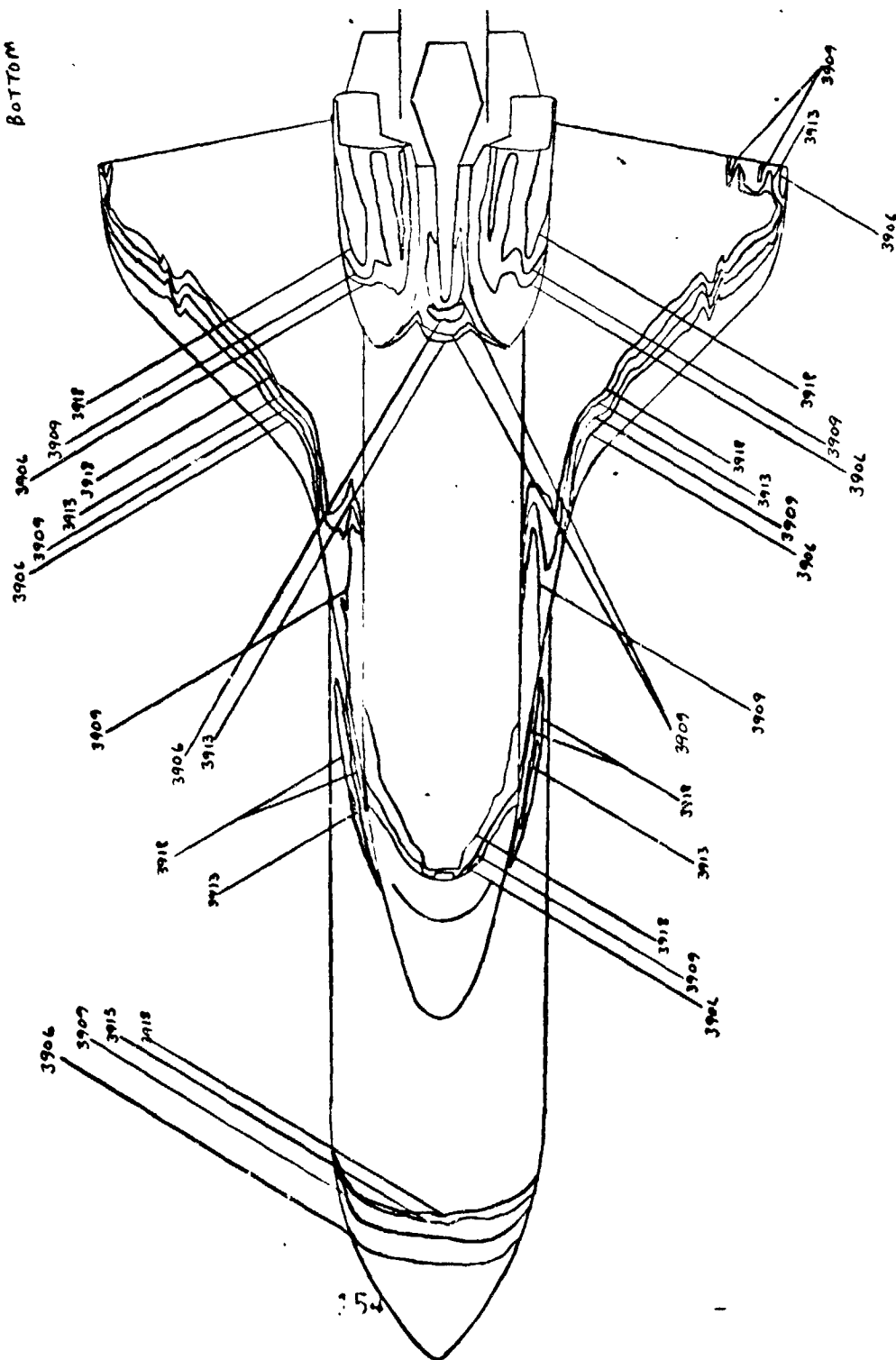


Yes





7681  
GP 19  
BOTTOM



M.2.

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6/29/73

MASA-RI ORBITER HEATING

VA289

AEDC(ARO,INC.) ARNOLD AFS, TENNESSEE  
VON KARMAN GAS DYNAMICS FACILITY  
50 INCH HYPERSONIC TUNNEL A

GROUP CONFID MODEL MACH NO PO(PSIA) TO(IDEG R) ALPHA-MODEL ALPHA-SECTION ALPHA-PREBEND ROLL-MODEL YAW  
19 1 MA,ED 8.00 858.3 1342 -.02 .02 0 180.00 -.00

T-INF P-INF Q-INF V-INF MU-INF RHO-INF RE/FT MREF STREF  
INSG R (PSIA) (FT/SEC) (SLUGS/FT3) (LR-SEC/FT2) (FT-L) (R=.0175FT) (R=.0175FT)

47.2 .088 3.939 3865 7.587E-05 7.827E-08 3.747E 06 4.907E-02 2.099E-02

CAMERA ROLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHOXCK) TBAR(10) 3ETA(10)

TOP(T) 8108 150 80 .0496 0 0

UPPER SIDE(US) 8244

LOWER SIDE(LS) 8495

MOTTON(R) 7681

PIC NO TIME DELTIME H(TO) H(TO)/HREF H(-9TO) H(-85TO) H(-85TO)/HREF ST(10)

H 3903(150) 1.13 MODEL HAS NOT REACHED CENTERLINE H(-9TO) H(-85TO) H(-85TO)/HREF ST(10)  
T 8095(150) 1.15 MODEL HAS NOT REACHED CENTERLINE  
US 8131(150) 1.15 MODEL HAS NOT REACHED CENTERLINE  
LS 2134(150) 1.15 MODEL HAS NOT REACHED CENTERLINE  
H 3904(150) 2.23 MODEL HAS NOT REACHED CENTERLINE  
T 8096(150) 2.23 MODEL HAS NOT REACHED CENTERLINE  
LS 2135(150) 2.23 MODEL HAS NOT REACHED CENTERLINE  
US 8132(150) 2.25 MODEL HAS NOT REACHED CENTERLINE

INJECT TIME = 2.65

T 8097(150) 3.20 1.01 3.063E-03 .0625 1.735E-03 .0762 4.194E-03 .0856 1.299E-03  
H 3905(150) 3.30 1.01 3.063E-03 .0625 1.735E-03 .0762 4.194E-03 .0856 1.299E-03  
US 8133(150) 3.33 1.04 3.042E-03 .0621 3.709E-03 .0757 4.165E-03 .0850 1.291E-03  
LS 2136(150) 3.33 1.84 3.042E-03 .0621 3.709E-03 .0757 4.165E-03 .0850 1.291E-03  
T 8098(150) 4.41 2.92 2.416E-03 .0493 2.946E-03 .0601 3.308E-03 .0675 1.025E-03  
US 8134(150) 4.41 2.92 2.416E-03 .0493 2.946E-03 .0601 3.308E-03 .0675 1.025E-03  
H 3906(150) 4.41 2.92 2.416E-03 .0493 2.946E-03 .0601 3.308E-03 .0675 1.025E-03  
LS 2137(150) 4.41 2.92 2.416E-03 .0493 2.946E-03 .0601 3.308E-03 .0675 1.025E-03  
T 8099(150) 5.48 3.99 2.065E-03 .0421 2.518E-03 .0514 2.628E-03 .0577 8.763E-04  
US 8135(150) 5.48 3.99 2.065E-03 .0421 2.518E-03 .0514 2.628E-03 .0577 8.763E-04  
H 3907(150) 5.48 3.99 2.065E-03 .0421 2.518E-03 .0514 2.628E-03 .0577 8.763E-04  
LS 2138(150) 5.48 3.99 2.065E-03 .0421 2.518E-03 .0514 2.628E-03 .0577 8.763E-04  
T 8100(150) 6.56 5.07 1.832E-03 .0374 2.235E-03 .0456 2.509E-03 .0512 7.776E-04  
H 3908(150) 6.56 5.07 1.832E-03 .0374 2.235E-03 .0456 2.509E-03 .0512 7.776E-04  
LS 2139(150) 6.56 5.07 1.832E-03 .0374 2.235E-03 .0456 2.509E-03 .0512 7.776E-04  
T 8101(150) 6.58 5.09 1.828E-03 .0373 2.229E-03 .0455 2.503E-03 .0511 7.759E-04  
US 8136(150) 7.63 6.14 1.664E-03 .0340 2.029E-03 .0414 2.279E-03 .0465 7.062E-04  
H 3909(150) 7.63 6.14 1.664E-03 .0340 2.029E-03 .0414 2.279E-03 .0465 7.062E-04

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6/29/73

WASA-RI ORBITER HEATING  
 VA289  
 AEDC(ARO, INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL A

GROUP	CONFIG	MODEL	MACH NO	PO(PSIA)	TO( DEG R)	ALPHA-MODEL	ALPHA-SECTOR	ALPHA-PREBEND	ROLL-MODEL	YAW
19	1	MATED	8.00	857.9	1341	-0.02	.02	0	189.00	-0.00
Y-INF	P-INF	Q-INF	V-INF	RMO-INF	MU-INF	KE/FT	MREF	STREF		
IDEG R	(PSIA)	(FT/SEC)	(SLUGS/FT <sup>3</sup> )	(LB-SEC/FT <sup>2</sup> )	(FT-1)	(R=)	(R=)	(R=)		
97.2	.088	3.937	3865	7.585E-05	7.826E-08	3.746E 06	4.900E-02	2.100E-02		
CAMERA	ROLL NO	PAINT TEMP (DEG F)	INITIAL TEMP (DEG F)	SQUARE ROOT (RHOXCKX)	TRAR(TO)	BETA(TO)				
TOP(T)	8108									
UPPER SIDE(US)	8244									
LOWER SIDE(LS)	8495									
BOTTOM(B)	7681									

PIC NO	TIME DELTME	H(TO)	HREF	M(-9TO)	M(-9TO)/HREF	M(-85TO)	M(-85TO)/HREF	ST(TO)
US A137(150)	7.66	6.17	1.661E-03	.0339	2.025E-03	.0413	2.274E-03	7.047E-04
LS 2140(150)	7.66	6.17	1.661E-03	.0339	2.025E-03	.0413	2.274E-03	7.047E-04
T A102(150)	8.71	7.22	1.535E-03	.0313	1.872E-03	.0382	2.102E-03	6.517E-04
M 3910(150)	8.71	7.22	1.535E-03	.0313	1.872E-03	.0382	2.102E-03	6.517E-04
LS 2141(150)	8.71	7.22	1.535E-03	.0313	1.872E-03	.0382	2.102E-03	6.517E-04
US A134(150)	8.74	7.24	1.533E-03	.0313	1.869E-03	.0381	2.098E-03	6.506E-04
T A103(150)	9.79	8.30	1.432E-03	.0292	1.746E-03	.0356	1.961E-03	6.079E-04
M 3911(150)	9.79	8.30	1.432E-03	.0292	1.746E-03	.0356	1.961E-03	6.079E-04
LS 2142(150)	9.79	8.30	1.432E-03	.0292	1.746E-03	.0356	1.961E-03	6.079E-04
US A139(150)	9.81	8.32	1.430E-03	.0292	1.744E-03	.0356	1.958E-03	6.069E-04
T A104(150)	10.66	9.37	1.347E-03	.0275	1.643E-03	.0335	1.845E-03	5.720E-04
M 3912(150)	10.66	9.37	1.347E-03	.0275	1.643E-03	.0335	1.845E-03	5.720E-04
LS 2143(150)	10.66	9.37	1.347E-03	.0275	1.643E-03	.0335	1.845E-03	5.720E-04
US A146(150)	10.69	9.40	1.346E-03	.0275	1.641E-03	.0335	1.843E-03	5.712E-04
T A105(150)	11.54	10.45	1.276E-03	.0260	1.556E-03	.0318	1.748E-03	5.416E-04
M 3913(150)	11.54	10.45	1.276E-03	.0260	1.556E-03	.0318	1.748E-03	5.416E-04
LS 2144(150)	11.54	10.45	1.276E-03	.0260	1.556E-03	.0318	1.748E-03	5.416E-04
US A141(150)	11.56	10.47	1.275E-03	.0260	1.554E-03	.0317	1.746E-03	5.410E-04
T A106(150)	13.01	11.53	1.215E-03	.0248	1.492E-03	.0302	1.664E-03	5.157E-04
M 3914(150)	13.01	11.53	1.215E-03	.0248	1.492E-03	.0302	1.664E-03	5.157E-04
LS 2145(150)	13.01	11.53	1.215E-03	.0248	1.492E-03	.0302	1.664E-03	5.157E-04
US A142(150)	13.04	11.55	1.214E-03	.0248	1.490E-03	.0302	1.662E-03	5.151E-04
T A107(150)	14.09	12.61	1.162E-03	.0237	1.417E-03	.0289	1.591E-03	4.934E-04
M 3915(150)	14.09	12.61	1.162E-03	.0237	1.417E-03	.0289	1.591E-03	4.934E-04
LS 2146(150)	14.09	12.60	1.162E-03	.0237	1.417E-03	.0289	1.591E-03	4.934E-04

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6/29/73

NASA-RI ORBITER HEATING

VA289

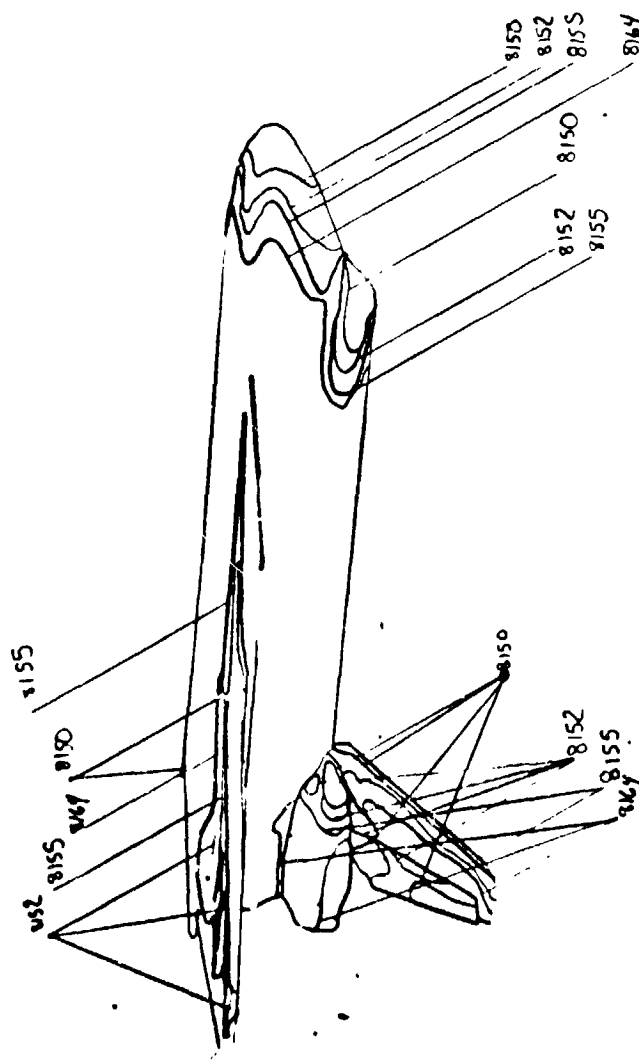
AEC(ARO, INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL R

GROUP	CONFIG	MODEL	MACH NO	PO(PSIA)	TO(DEG R)	ALPHA-MODEL	ALPHA-SECTOR	ALPHA-PREBEND	ROLL-MODEL	YAW
19	1	MATED	8.00	857.5	1341	-0.02	.02	0	180.00	-0.00
T-1A	P-1NF	Q-1NF	V-1NF	RHO-1NF	MU-1NF	RF/FT	MREF	STREF		
(DEG R)	(PSIA)	(FT/SEC)	(SLUGS/FT <sup>3</sup> )	(LB-SEC/FT <sup>2</sup> )	(FT-1)	(R= .0175FT)	(R= .0175FT)			
97.2	.088	3.935	1865	7.541E-05	7.822E-08	3.744E 06	4.898E-02	2.100E-02		
CAMERA	ROLL NO	PAINT TEMP (DEG F)	INITIAL TEMP (DEG F)	SQUARE ROOT (RHO/CXK)	TBAR(TO)	BETA(TO)				
TOP(T)	8108		80	.0496						
UPPER SIDE(US)	8244									
LOWER SIDE(LS)	8495									
MOTOM(B)	7681									

PIC NO	TIME DELTIME	H(TO)	H(TO)/MREF	H(.9TO)	H(.9TO)/MREF	H(.85TO)	H(.85TO)/MREF	ST(TO)
US 8143(150)	14.12	1.161E-03	.0237	1.416E-03	.0289	1.590E-03	.0325	4.930E-04
T 8108(150)	15.17	1.115E-03	.0228	1.340E-03	.0278	1.528E-03	.0312	4.736E-04
M 3916(150)	15.17	1.115E-03	.0228	1.340E-03	.0278	1.528E-03	.0312	4.736E-04
LS 2147(150)	15.17	1.115E-03	.0228	1.340E-03	.0278	1.528E-03	.0312	4.736E-04
US 8144 150)	15.19	1.114E-03	.0227	1.349E-03	.0277	1.528E-03	.0312	4.731E-04
T 8104(150)	16.24	1.074E-03	.0219	1.310E-03	.0267	1.471E-03	.0300	4.560E-04
LS 2148(150)	16.24	1.074E-03	.0219	1.310E-03	.0267	1.471E-03	.0300	4.560E-04
US 8145(150)	16.27	1.073E-03	.0219	1.309E-03	.0267	1.468E-03	.0300	4.557E-04
T 8110(150)	17.32	1.037E-03	.0212	1.264E-03	.0258	1.420E-03	.0290	4.401E-04
M 3914(150)	17.32	1.037E-03	.0212	1.264E-03	.0258	1.420E-03	.0290	4.401E-04
LS 2149(150)	17.32	1.037E-03	.0212	1.264E-03	.0258	1.420E-03	.0290	4.401E-04
US 8146(150)	17.34	1.036E-03	.0211	1.263E-03	.0258	1.419E-03	.0290	4.398E-04
MODEL HAS 1-FT CENTERLINE								
T 8111(150)	18.40	1.003E-03	.0205	1.223E-03	.0250	1.374E-03	.0280	4.259E-04
M 3914(150)	18.40	1.003E-03	.0205	1.223E-03	.0250	1.374E-03	.0280	4.259E-04
LS 2150(150)	18.40	1.003E-03	.0205	1.223E-03	.0250	1.374E-03	.0280	4.259E-04
US 8147(150)	18.42	1.003E-03	.0205	1.223E-03	.0250	1.373E-03	.0280	4.257E-04

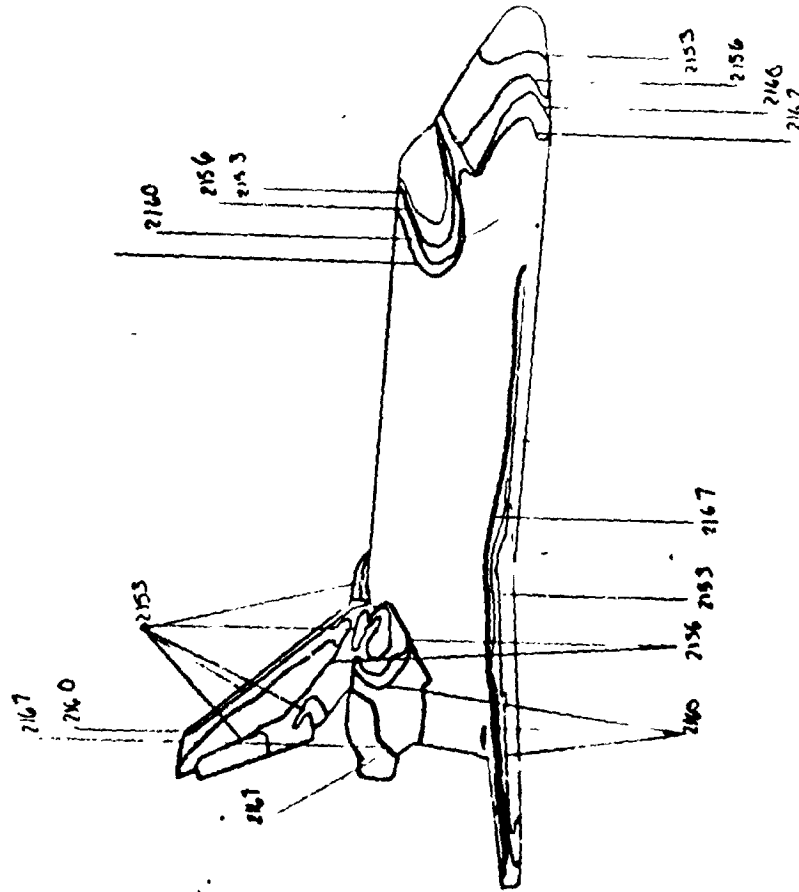
8244  
GP 20  
Upper Side

5



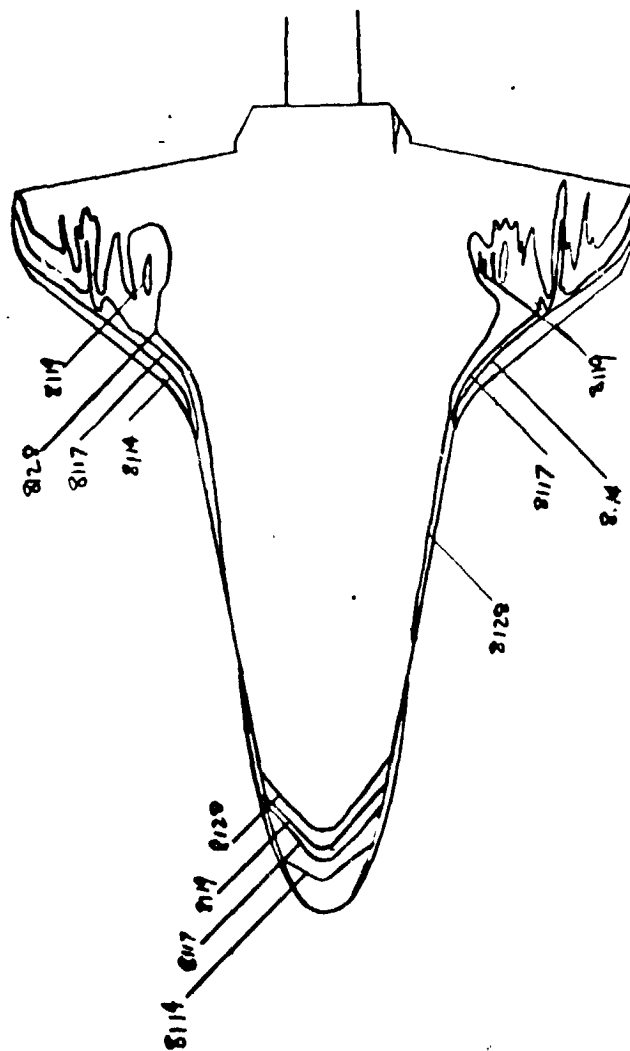
8495  
GP 20  
Lower Side

nd

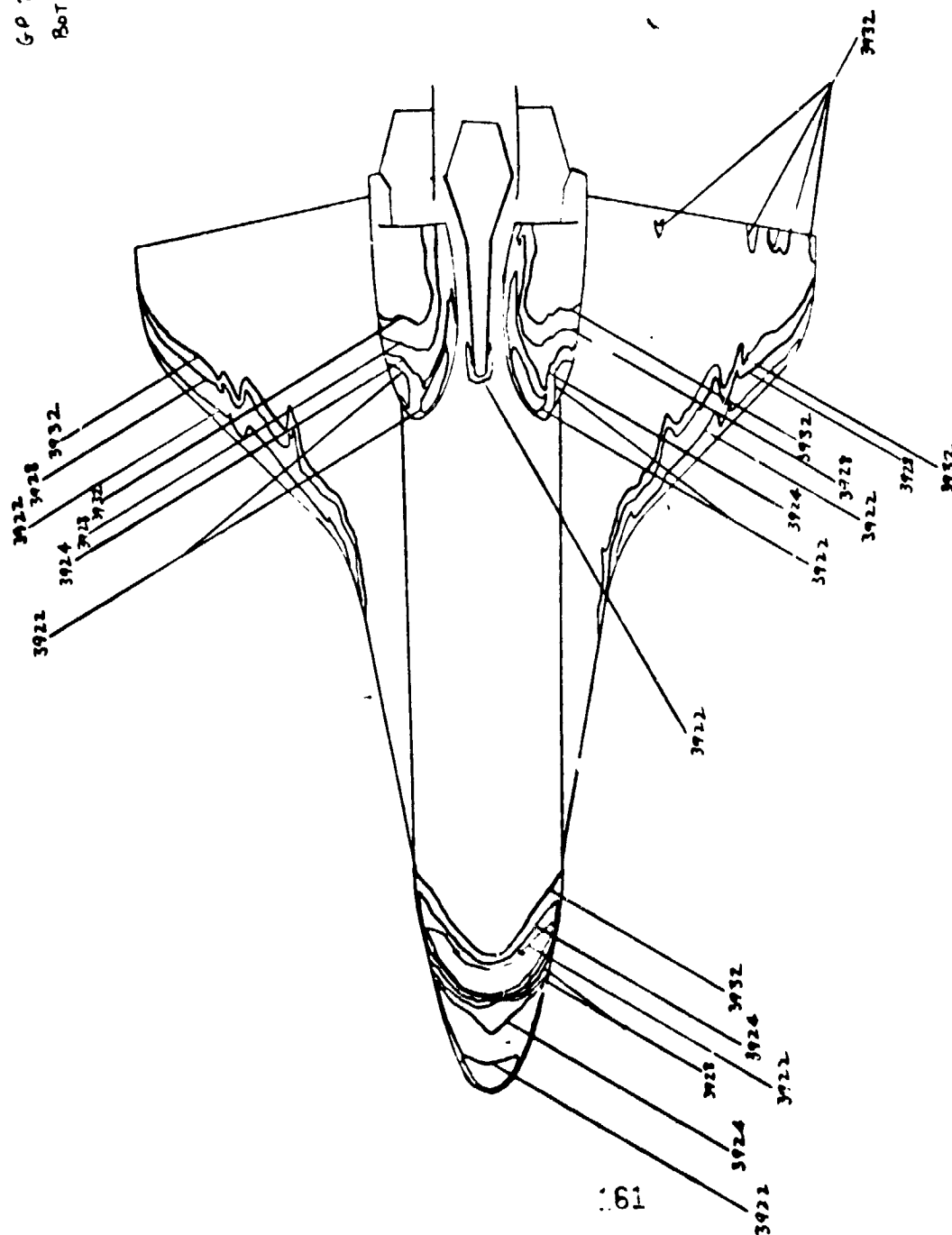


8108  
GP20  
TOP

cwe



7681  
GP 20  
Bottom





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 UNCLASSIFIED  
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6/29/73

AEDCI(ARO-INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL #

NASA-RI ORBITER HEATING

VA200

GROUP CNF1G MODEL MACH NO M01PS1A1 TU( DEG R) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREBEND ROLL-MODEL YAW  
 20 2 ORBITER S 8.00 857.3 1344 -.03 .03 0 180.00 -.00

T-INF P-INF Q-INF V-INF MU-INF RHO-INF RE/FT MREF SINEF  
 (DEG R) (PSIA) (PSIA) (FT/SEC) (SLUGS/FT3) (LB-SEC/FT2) (FT-1) (R= .0175FT) (R= .0175FT)  
 27.4 .084 3.934 1049 7.464E-05 7.462E-08 3.732E 66 4.900E-02 2.103E-02

CAPRA ROLL NO PAINT IFMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHOXCKA) TBAR(TO) BETA(TO)  
 TOPIT 0100  
 UPPER SINE(US) 8244  
 LOWER SINE(LS) 8495  
 MOTTCH(M) 7601

200 .0519 1.492E-01 1.5018E-01

PIC NO TIME DELTIME M1(0) M1(0)/MREF M1(010) M1(010)/MREF M1(.0510) M1(.0510)/MREF M1(.0510)/MREF ST(TO)

US 2154(200)	7.63	6.14	7.144E-03	.0492	3.084E-03	.0793	4.402E-03	.0899	1.333E-03
T 2119(200)	8.68	7.24	2.908E-03	.0593	3.509E-03	.0732	4.068E-03	.0830	1.231E-03
M 2027(200)	8.68	7.24	2.908E-03	.0593	3.509E-03	.0732	4.068E-03	.0830	1.231E-03
LS 2154(200)	8.68	7.24	2.908E-03	.0593	3.509E-03	.0732	4.068E-03	.0830	1.231E-03
US 2155(200)	8.71	7.22	2.901E-03	.0592	3.502E-03	.0731	4.061E-03	.0829	1.229E-03
T 2120(200)	9.76	8.27	2.710E-03	.0553	3.347E-03	.0683	3.794E-03	.0774	1.146E-03
M 2028(200)	9.76	8.27	2.710E-03	.0553	3.347E-03	.0683	3.794E-03	.0774	1.146E-03
LS 2150(200)	9.76	8.27	2.710E-03	.0553	3.347E-03	.0683	3.794E-03	.0774	1.146E-03
US 2154(200)	9.79	8.34	2.708E-03	.0552	3.342E-03	.0682	3.788E-03	.0773	1.147E-03
T 2121(200)	10.84	9.35	2.549E-03	.0520	3.149E-03	.0643	3.509E-03	.0728	1.081E-03
M 2024(200)	10.84	9.35	2.549E-03	.0520	3.149E-03	.0643	3.509E-03	.0728	1.081E-03
LS 2160(200)	10.84	9.35	2.549E-03	.0520	3.149E-03	.0643	3.509E-03	.0728	1.081E-03
US 2157(200)	10.86	9.37	2.544E-03	.0493	2.922E-03	.0609	3.380E-03	.0690	1.023E-03
T 2122(200)	11.91	10.42	2.414E-03	.0493	2.922E-03	.0609	3.380E-03	.0690	1.023E-03
M 2031(200)	11.91	10.42	2.414E-03	.0493	2.922E-03	.0609	3.380E-03	.0690	1.023E-03
LS 2161(200)	11.91	10.42	2.414E-03	.0493	2.922E-03	.0609	3.380E-03	.0690	1.023E-03
US 2158(200)	11.94	10.45	2.411E-03	.0492	2.919E-03	.0608	3.374E-03	.0689	1.022E-03
T 2123(200)	12.59	11.54	2.244E-03	.0469	2.839E-03	.0579	3.214E-03	.0657	9.741E-04
M 2032(200)	12.59	11.54	2.244E-03	.0469	2.839E-03	.0579	3.214E-03	.0657	9.741E-04
LS 2162(200)	12.59	11.54	2.244E-03	.0469	2.839E-03	.0579	3.214E-03	.0657	9.741E-04
US 2159(200)	13.01	11.53	2.244E-03	.0469	2.839E-03	.0579	3.214E-03	.0657	9.741E-04
T 2124(200)	14.07	12.58	2.144E-03	.0448	2.712E-03	.0554	3.017E-03	.0628	9.317E-04
M 2033(200)	14.07	12.58	2.144E-03	.0448	2.712E-03	.0554	3.017E-03	.0628	9.317E-04
LS 2163(200)	14.09	12.60	2.144E-03	.0448	2.712E-03	.0554	3.017E-03	.0628	9.317E-04
US 2160(200)	14.09	12.60	2.144E-03	.0448	2.712E-03	.0554	3.017E-03	.0628	9.317E-04
T 2125(200)	14.09	12.60	2.144E-03	.0448	2.712E-03	.0554	3.017E-03	.0628	9.317E-04
M 2034(200)	14.09	12.60	2.144E-03	.0448	2.712E-03	.0554	3.017E-03	.0628	9.317E-04
LS 2163(200)	14.09	12.60	2.144E-03	.0448	2.712E-03	.0554	3.017E-03	.0628	9.317E-04

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 \* UNCLASSIFIED \*  
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6/28/73

MASA-RI ORBITER HEATING

V1298

AEDCIAROMAC) ARNOLD AFS, TF WESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL #

GROUP CONFIG MODEL MACH NO POS(PISA) TO( DEG R) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREBEND ROLL-MODEL YAW  
 24 2 ORBITER S 9.08 857.3 1344 -.03 .03 0 100.00 -.00

T-INF P-INF Q-INF V-INF MU-INF RUO-INF RE/FT HREF STREF  
 (DEG R) (PSIA) (FT/SEC) (SLUGS/FT<sup>2</sup>) (FT-1) (R-0175FT) (R-0175FT)  
 97.4 .088 3.934 1064 7.564E-04 7.642E-08 3.732E 06 4.905E-02 2.103E-02

CAMERA POLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHORCK) TBAR(10) BETA(10)  
 100(T) 8108  
 UPPER SIDE(US) 8244  
 LOWER SIDE(LS) 4495  
 BOTTOM(0) 7681

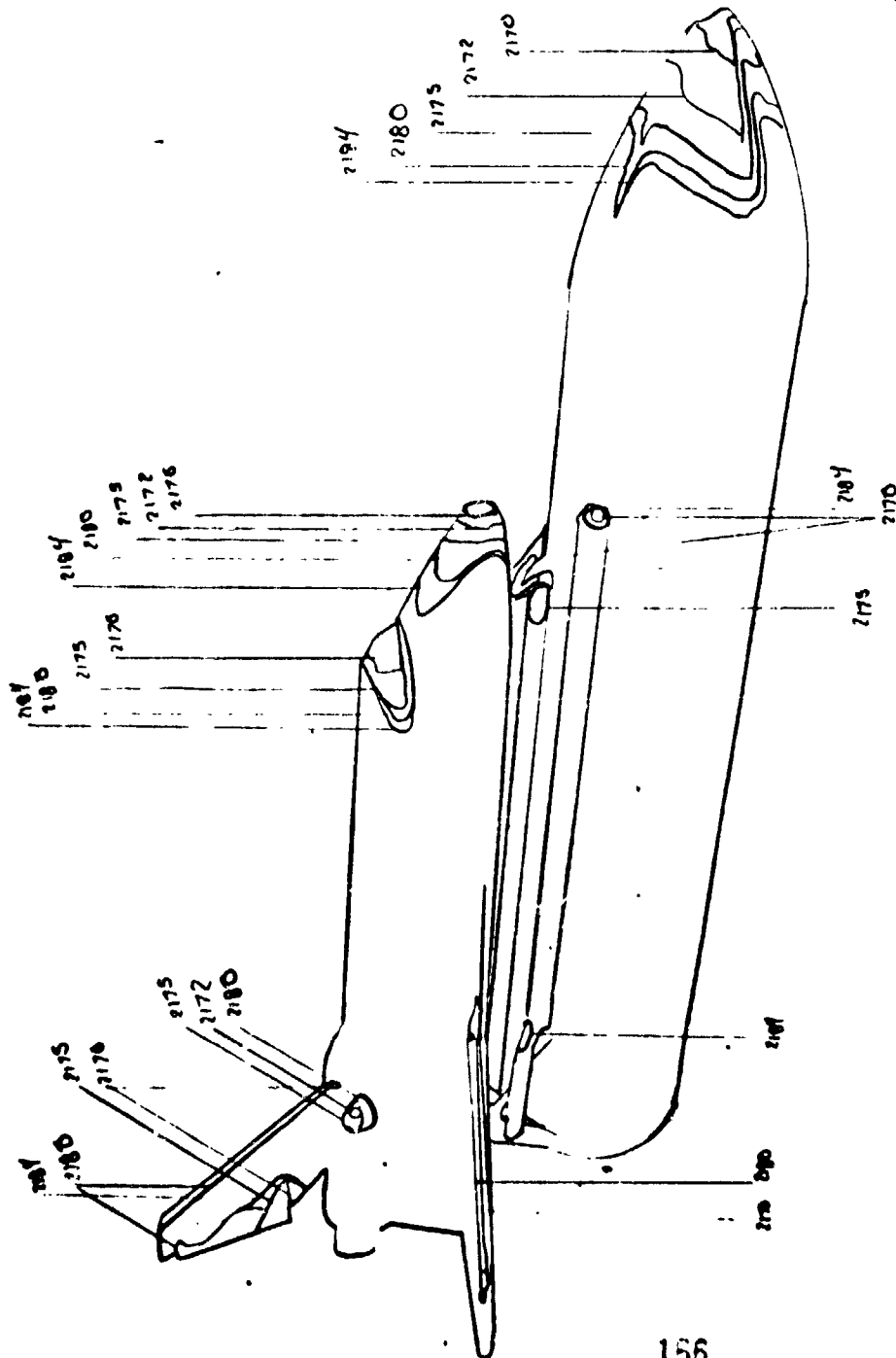
0510 1.492E-01 1.5018E-01

PTC NO	TIME DELTIME	H(TOI)	H(TOI)/HREF	M(.9TOI)	M(.9TOI)/HREF	M(.85TOI)	M(.85TOI)/HREF	ST(10)
T 1125(200)	15.14 13.66	2.109E-03	.0430	2.605E-03	.0532	2.953E-03	.0603	8.939E-04
M 1931(200)	15.14 13.66	2.109E-03	.0430	2.605E-03	.0532	2.953E-03	.0603	8.939E-04
LS 2164(200)	15.14 13.66	2.109E-03	.0430	2.605E-03	.0532	2.953E-03	.0603	8.939E-04
US 1161(200)	15.17 13.68	2.107E-03	.0430	2.603E-03	.0531	2.951E-03	.0602	8.932E-04
T 1126(200)	16.22 14.73	2.031E-03	.0414	2.508E-03	.0512	2.843E-03	.0580	8.606E-04
M 1434(200)	16.22 14.73	2.031E-03	.0414	2.508E-03	.0512	2.843E-03	.0580	8.606E-04
LS 2165(200)	16.22 14.73	2.031E-03	.0414	2.508E-03	.0512	2.843E-03	.0580	8.606E-04
US 1162(200)	16.24 14.74	2.029E-03	.0414	2.506E-03	.0511	2.841E-03	.0580	8.599E-04
T 1127(200)	17.29 15.81	1.940E-03	.0408	2.421E-03	.0494	2.745E-03	.0560	8.308E-04
M 1435(200)	17.29 15.81	1.940E-03	.0408	2.421E-03	.0494	2.745E-03	.0560	8.308E-04
LS 2166(200)	17.32 15.83	1.940E-03	.0408	2.421E-03	.0494	2.745E-03	.0560	8.308E-04
US 1163(200)	17.32 15.83	1.940E-03	.0408	2.421E-03	.0494	2.745E-03	.0560	8.308E-04
T 1128(200)	18.37 16.88	1.847E-03	.0387	2.343E-03	.0478	2.656E-03	.0542	8.040E-04
M 1436(200)	18.37 16.88	1.847E-03	.0387	2.343E-03	.0478	2.656E-03	.0542	8.040E-04
LS 2167(200)	18.37 16.88	1.847E-03	.0387	2.343E-03	.0478	2.656E-03	.0542	8.040E-04
US 1164(200)	18.40 16.91	1.846E-03	.0387	2.341E-03	.0478	2.654E-03	.0542	8.033E-04

MODEL WAS LEFT CENTERLINE

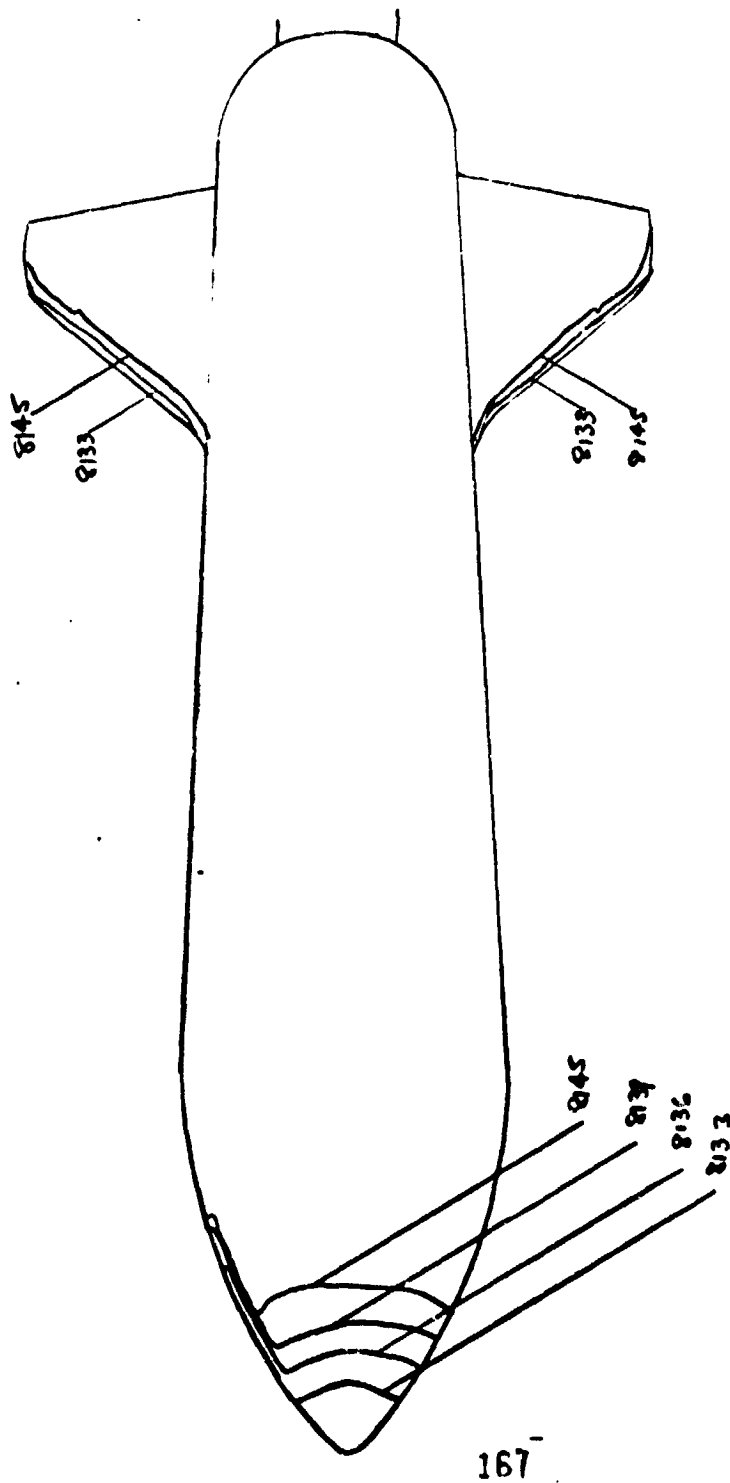


8495  
6071  
Lower Side



8108  
GP 21  
TOP

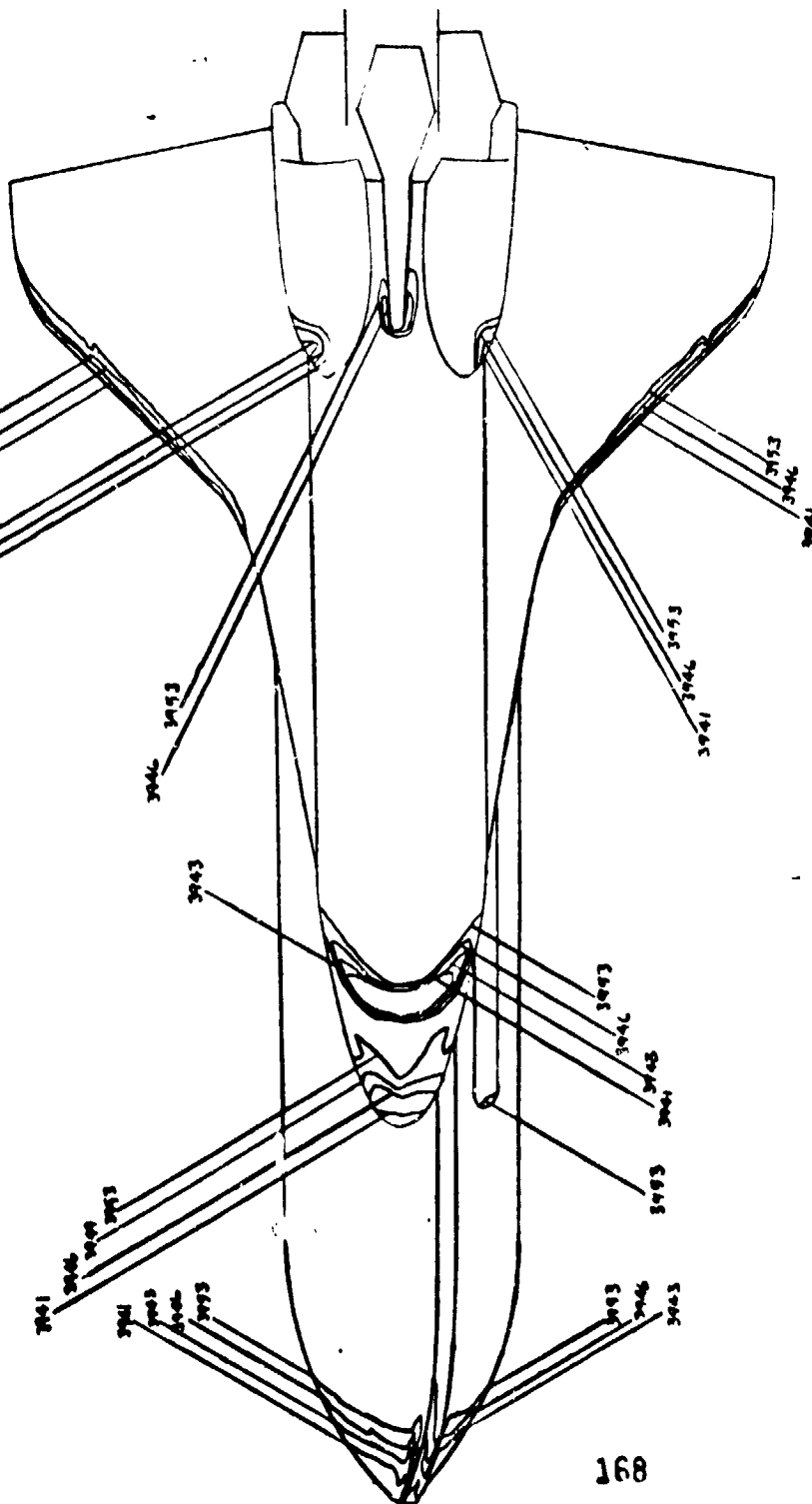
CWC



7681  
GP 21  
BOTTOM

CM 2.

7681



UNCLASSIFIED

6/29/73

**MASA-RY ORBITER HEATING**

AEDCIARQ, INC.) ARNOLD AFS, TENNESSEE  
VON KARMAN GAS DYNAMICS FACILITY  
50 INCH HYPERSONIC TUNNEL #4

**6B2VA**

[illegible][illegible]

Country	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059	2060	2061	2062	2063	2064	2065	2066	2067	2068	2069	2070	2071	2072	2073	2074	2075	2076	2077	2078	2079	2080	2081	2082	2083	2084	2085	2086	2087	2088	2089	2090	2091	2092	2093	2094	2095	2096	2097	2098	2099	2100	2101	2102	2103	2104	2105	2106	2107	2108	2109	2110	2111	2112	2113	2114	2115	2116	2117	2118	2119	2120	2121	2122	2123	2124	2125	2126	2127	2128	2129	2130	2131	2132	2133	2134	2135	2136	2137	2138	2139	2140	2141	2142	2143	2144	2145	2146	2147	2148	2149	2150	2151	2152	2153	2154	2155	2156	2157	2158	2159	2160	2161	2162	2163	2164	2165	2166	2167	2168	2169	2170	2171	2172	2173	2174	2175	2176	2177	2178	2179	2180	2181	2182	2183	2184	2185	2186	2187	2188	2189	2190	2191	2192	2193	2194	2195	2196	2197	2198	2199	2200	2201	2202	2203	2204	2205	2206	2207	2208	2209	2210	2211	2212	2213	2214	2215	2216	2217	2218	2219	2220	2221	2222	2223	2224	2225	2226	2227	2228	2229	2230	2231	2232	2233	2234	2235	2236	2237	2238	2239	2240	2241	2242	2243	2244	2245	2246	2247	2248	2249	2250	2251	2252	2253	2254	2255	2256	2257	2258	2259	2260	2261	2262	2263	2264	2265	2266	2267	2268	2269	2270	2271	2272	2273	2274	2275	2276	2277	2278	2279	2280	2281	2282	2283	2284	2285	2286	2287	2288	2289	2290	2291	2292	2293	2294	2295	2296	2297	2298	2299	2300	2301	2302	2303	2304	2305	2306	2307	2308	2309	2310	2311	2312	2313	2314	2315	2316	2317	2318	2319	2320	2321	2322	2323	2324	2325	2326	2327	2328	2329	2330	2331	2332	2333	2334	2335	2336	2337	2338	2339	2340	2341	2342	2343	2344	2345	2346	2347	2348	2349	2350	2351	2352	2353	2354	2355	2356	2357</
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• UNCLASSIFIED •

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UNCLASSIFIED  
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6/29/73

NASA-RI ORBITER HEATING  
AEDC(ARD, INC.) ARNOLD AFS, TENNESSEE  
VON KARMAN GAS DYNAMICS FACILITY  
50 INCH HYPERSONIC TUNNEL A

VA299

GROUP	CONFID	MODEL	MACH NO	PO(PST)	TO(DEC R)	ALPHA-MODEL	ALPHA-SECTOR	ALPHA-PREBEND	ROLL-MODEL	YAW
21	1	MATED	8.00	858.2	1351	-.03	.03	0	180.00	-.00
<p>T-INF P-INF Q-INF RHO-INF MU-INF RE/FT MREF STREF            (DEG R) (PST) (PSIA) (FT/SEC) (SLUGS/FT<sup>3</sup>) (LB-SEC/FT<sup>2</sup>) (FT-1) (R=.0175FT) (R=.0175FT)            97.9 .088 3.938 3874 7.536E-05 7.880E-08 3.709E 06 4.906E-02 2.108E-02</p>										
<p>CAMERA ROLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHOXCK) T8AR(TO) BETA(TO)            TOP(T) 8104            UPPER SIDE(US) 8244            LOWER SIDE(LS) 8495            BOTTOM(B) 7681</p>										

PIC NO	TIME	DELTIME	M(TO)	M(TO)/MREF	M(.9TO)	M(.9TO)/MREF	M(.85TO)	M(.85TO)/MREF	ST(TO)
US 8171(150)	7.68	6.14	8.962E-03	.1827	1.170E-02	.2384	1.302E-02	.2817	3.772E-03
T 8136(150)	8.74	7.23	8.285E-03	.1689	1.081E-02	.2204	1.278E-02	.2604	3.487E-03
R 3944(150)	8.74	7.23	8.285E-03	.1689	1.081E-02	.2204	1.278E-02	.2604	3.487E-03
US 8172(150)	8.76	7.26	8.271E-03	.1686	1.079E-02	.2200	1.276E-02	.2600	3.482E-03
LS 2175(150)	8.76	7.26	8.271E-03	.1686	1.079E-02	.2200	1.276E-02	.2600	3.482E-03
T 8137(150)	9.81	8.31	7.730E-03	.1576	1.009E-02	.2056	1.192E-02	.2430	3.253E-03
R 3945(150)	9.81	8.31	7.730E-03	.1576	1.009E-02	.2056	1.192E-02	.2430	3.253E-03
US 8173(150)	9.84	8.33	7.718E-03	.1573	1.007E-02	.2053	1.190E-02	.2427	3.249E-03
LS 2176(150)	9.84	8.33	7.718E-03	.1573	1.007E-02	.2053	1.190E-02	.2427	3.249E-03
M 3946(150)	10.89	9.39	7.273E-03	.1482	9.492E-03	.1915	1.122E-02	.2286	3.061E-03
T 8138(150)	10.91	9.41	7.263E-03	.1481	9.482E-03	.1912	1.120E-02	.2284	3.058E-03
US 8174(150)	10.91	9.41	7.263E-03	.1481	9.482E-03	.1912	1.120E-02	.2284	3.058E-03
LS 2177(150)	10.91	9.41	7.263E-03	.1481	9.482E-03	.1912	1.120E-02	.2284	3.058E-03
T 8139(150)	11.99	10.49	6.881E-03	.1403	8.980E-03	.1831	1.061E-02	.2163	2.897E-03
US 8175(150)	11.99	10.49	6.881E-03	.1403	8.980E-03	.1831	1.061E-02	.2163	2.897E-03
M 3947(150)	11.99	10.49	6.881E-03	.1403	8.980E-03	.1831	1.061E-02	.2163	2.897E-03
LS 2178(150)	11.99	10.49	6.881E-03	.1403	8.980E-03	.1831	1.061E-02	.2163	2.897E-03
T 8140(150)	13.07	11.54	6.553E-03	.1336	8.552E-03	.1743	1.011E-02	.2060	2.759E-03
US 8176(150)	13.07	11.54	6.553E-03	.1336	8.552E-03	.1743	1.011E-02	.2060	2.759E-03
LS 2179(150)	13.07	11.54	6.553E-03	.1336	8.552E-03	.1743	1.011E-02	.2060	2.759E-03
T 8141(150)	13.09	11.59	6.545E-03	.1334	8.543E-03	.1742	1.009E-02	.2058	2.757E-03
US 8177(150)	14.14	12.64	6.267E-03	.1278	8.188E-03	.1667	9.666E-03	.1970	2.639E-03
LS 2180(150)	14.14	12.64	6.267E-03	.1278	8.188E-03	.1667	9.666E-03	.1970	2.639E-03

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6/29/73

NASA-RI ORBITER PEATING

VA289

AEDC(ARO,INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL R

GROUP COMPT6 MODEL MACH NO PO(PSIA) TO(EG R) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREBEND ROLL-MODEL YAW  
 21 1 MATED 4.00 458.0 1351 -.03 .03 0 189.00 -.00

T-1AF P-1NF Q-1NF V-1NF RHO-1NF MU-1NF RE/FT MREF STREF  
 (DEG R) (PSIA) (PSIA) (FT/SEC) (SLUGS/FT3) (LB-SEC/FT3) (FT-1) (R=.0175FT) (R=.0175FT)  
 97.4 .008 3.937 3876 7.535E-05 7.879E-08 3.700E 06 4.906E-02 2.186E-02

CAMERA ROLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHOXCHK) T0AR(TO) BETA(TO)  
 TOP(T) 8108  
 UPPER SIDE(S) 8244  
 LOWER SIDE(S) 8495  
 BOTTOM(B) 7681

350 .8550 3.322E-01 4.0509E-01

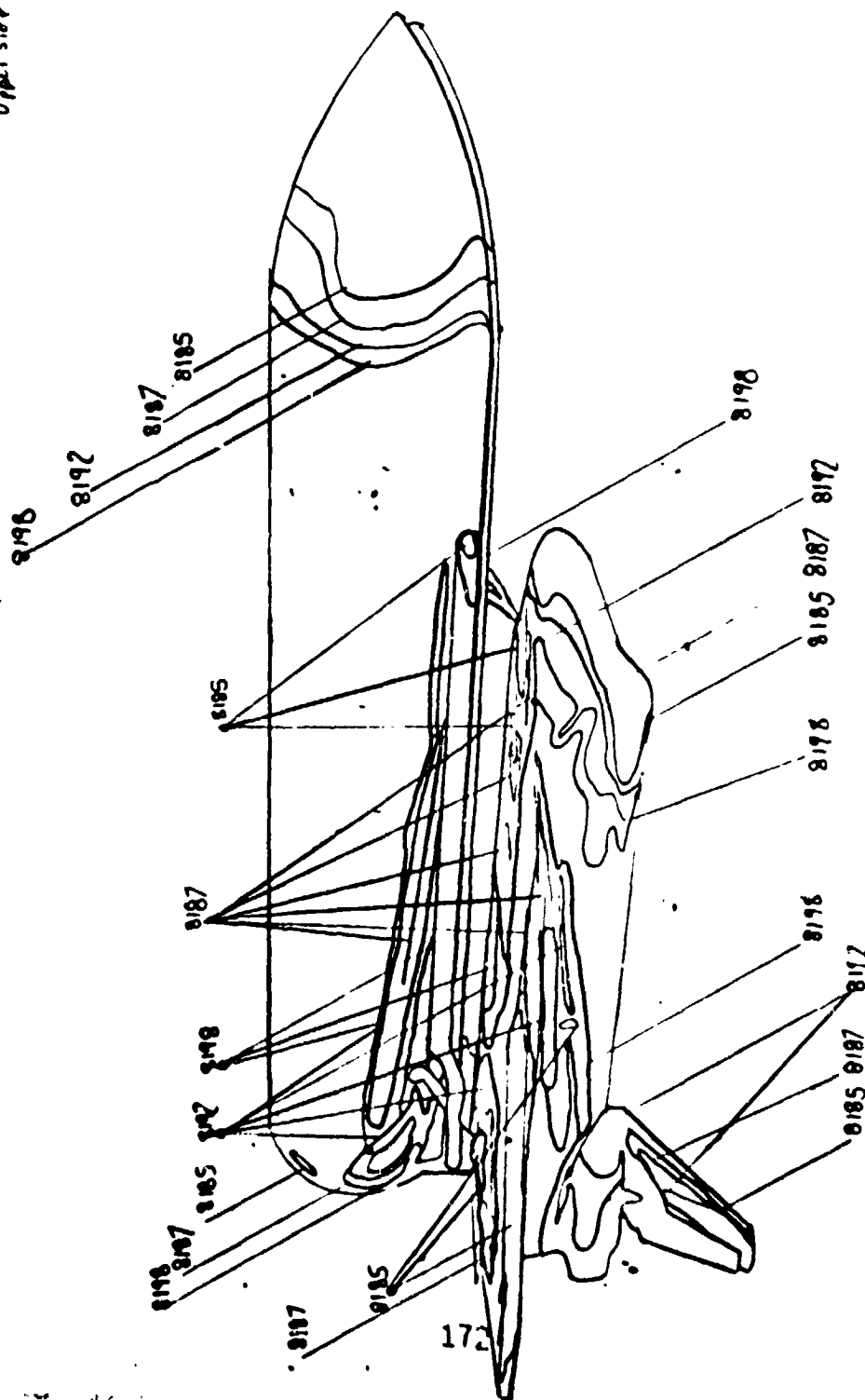
PIC NO TIME DELTIME M(TO) M(TO)/MREF M(-9TO) M(-9TO)/MREF M(-85TO) M(-85TO)/MREF ST(TO)  
 T A142(150) 15.22 13.71 6.016E-03 .1226 7.852E-03 .1601 9.279E-03 .1601 2.532E-03  
 US A170(150) 15.22 13.71 6.016E-03 .1226 7.852E-03 .1601 9.279E-03 .1601 2.532E-03  
 M A350(150) 15.22 13.71 6.016E-03 .1226 7.852E-03 .1601 9.279E-03 .1601 2.532E-03  
 LS A181(150) 15.22 13.71 6.016E-03 .1226 7.852E-03 .1601 9.279E-03 .1601 2.532E-03  
 T A142(150) 16.29 14.79 5.793E-03 .1181 7.561E-03 .1542 8.935E-03 .1542 2.441E-03  
 US A170(150) 16.29 14.79 5.793E-03 .1181 7.561E-03 .1542 8.935E-03 .1542 2.441E-03  
 M A350(150) 16.29 14.79 5.793E-03 .1181 7.561E-03 .1542 8.935E-03 .1542 2.441E-03  
 LS A181(150) 16.29 14.79 5.793E-03 .1181 7.561E-03 .1542 8.935E-03 .1542 2.441E-03  
 T A142(150) 17.37 15.87 5.593E-03 .1140 7.300E-03 .1488 8.627E-03 .1488 2.355E-03  
 US A170(150) 17.37 15.87 5.593E-03 .1140 7.300E-03 .1488 8.627E-03 .1488 2.355E-03  
 M A350(150) 17.37 15.87 5.593E-03 .1140 7.300E-03 .1488 8.627E-03 .1488 2.355E-03  
 LS A181(150) 17.37 15.87 5.593E-03 .1140 7.300E-03 .1488 8.627E-03 .1488 2.355E-03  
 T A142(150) 18.45 16.94 5.413E-03 .1103 7.064E-03 .1440 8.348E-03 .1440 2.278E-03  
 US A170(150) 18.45 16.94 5.413E-03 .1103 7.064E-03 .1440 8.348E-03 .1440 2.278E-03  
 M A350(150) 18.45 16.94 5.413E-03 .1103 7.064E-03 .1440 8.348E-03 .1440 2.278E-03  
 LS A181(150) 18.45 16.94 5.413E-03 .1103 7.064E-03 .1440 8.348E-03 .1440 2.278E-03  
 MODEL HAS LEFT CENTERLINE  
 T A142(150) 18.67 18.02 5.249E-03 .1070 6.850E-03 .1397 8.095E-03 .1397 2.210E-03  
 US A170(150) 18.67 18.02 5.249E-03 .1070 6.850E-03 .1397 8.095E-03 .1397 2.210E-03  
 M A350(150) 18.67 18.02 5.249E-03 .1070 6.850E-03 .1397 8.095E-03 .1397 2.210E-03  
 LS A181(150) 18.67 18.02 5.249E-03 .1070 6.850E-03 .1397 8.095E-03 .1397 2.210E-03  
 T A142(150) 19.55 18.04 5.245E-03 .1069 6.845E-03 .1396 8.089E-03 .1396 2.209E-03  
 US A170(150) 19.55 18.04 5.245E-03 .1069 6.845E-03 .1396 8.089E-03 .1396 2.209E-03

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171

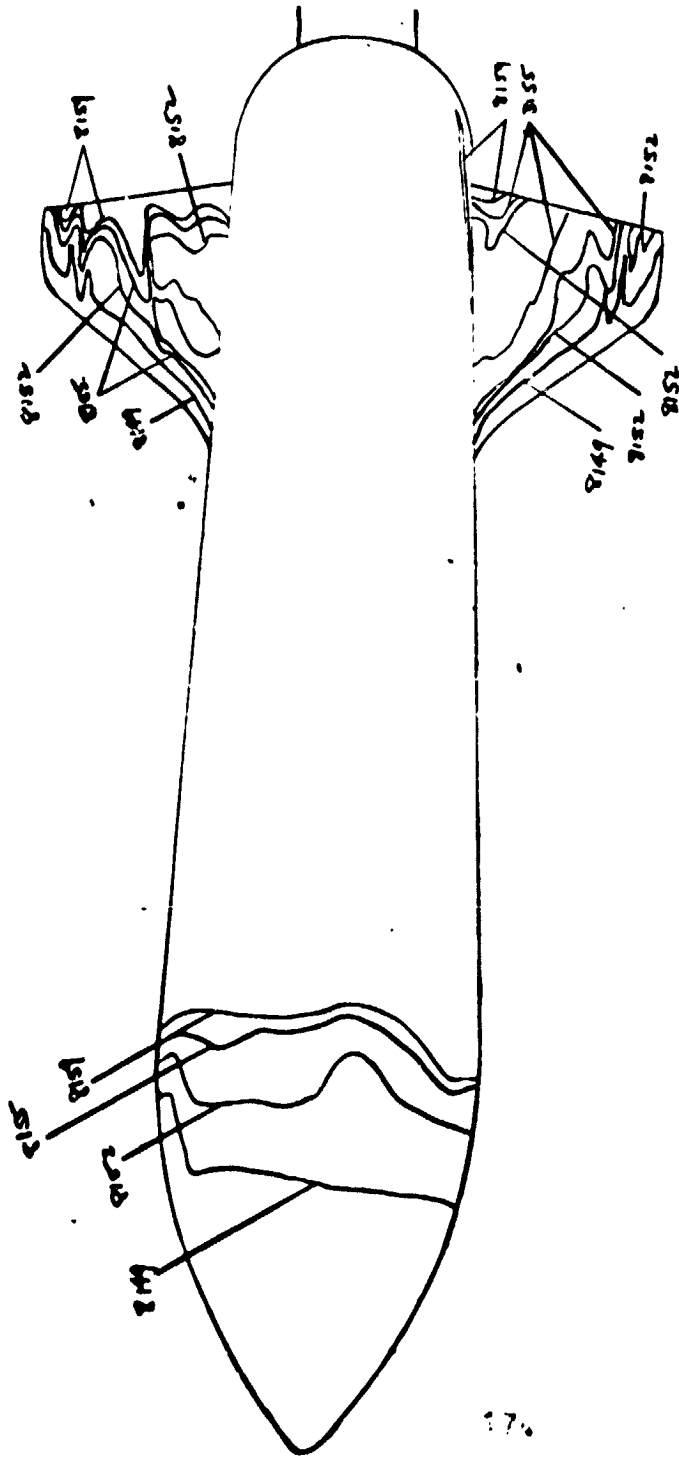


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CP 22  
Vppa: 5.68

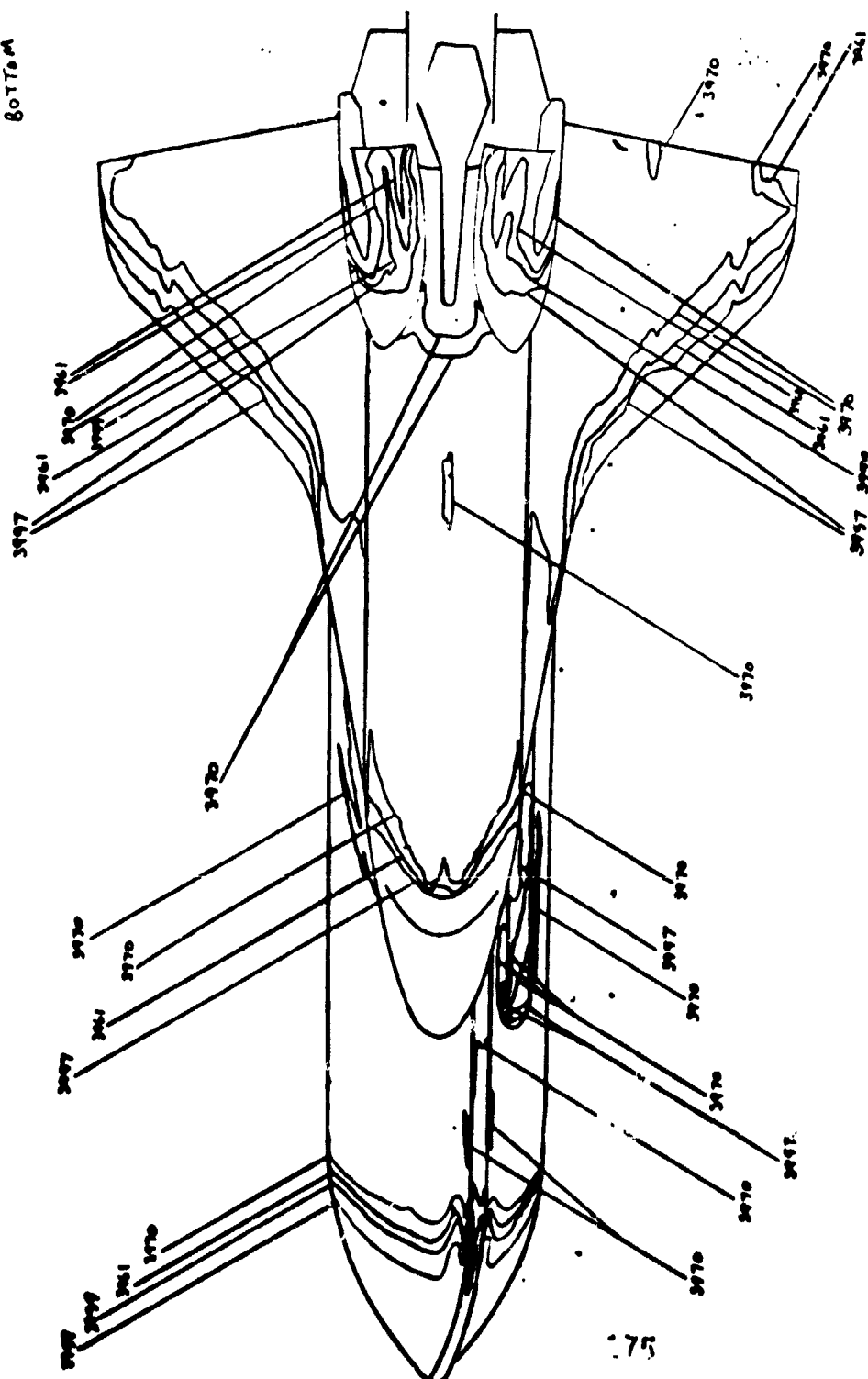




2108  
6P22  
TOP



CW6



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6/29/73

## NASA-BI ORBITER HEATING

V4204

AEDC(ARO,INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL N

GROUP	COMP16	MODEL	HACH	NO	PO1PSIA	TO1DEG	R1	ALPHA-MODEL	ALPHA-SECTOR	ALPHA-PREBEND	ROLL-MODEL	YAW
22	1	MATED	0.06	860.7	1351	-0.02	-0.02	0.02	0	100.00	-0.00	-0.00
T-14F	P-14F	O-14F	V-14F	W-14F	RMQ-14F	RMQ-14F	RMQ-14F	RMQ-14F	RMQ-14F	RMQ-14F	RMQ-14F	RMQ-14F
(DEG R)	(PSIA)	(FT/SFC)	(SLUGS/FT3)	(LBS/SEC/FT3)	(FT-1)	(FT-1)	(FT-1)	(FT-1)	(FT-1)	(FT-1)	(FT-1)	(FT-1)
97.0	3.950	3870	7.555E-05	7.822E-06	3.710E-06	4.915E-02	2.105E-02	2.105E-02	2.105E-02	2.105E-02	2.105E-02	2.105E-02
CAMERA	ROLL NO	PAINT TEMP (DEG F)	INITIAL TEMP (DEG F)	SQUARE ROOT (RMQFCAR)	TRAR(TO)	BETA(TO)						
TOP(T)	8108											
UPPER STONE(US)	8246	150	81	0.0496	0.518E-02	0.0938E-02						
LOWER STONE(LS)	8495											
MOTTON(M)	7681											

PIC NO	TIME DELT	TIME	DELTIME	M1(OTO)	M1(OTO)/MREF	M1(OTO)	M1(OTO)/MREF	M1(OTO)	M1(OTO)/MREF	M1(OTO)	M1(OTO)/MREF	ST(TO)
US 8109(150)	7.66	6.16	1.510E-03	0.0324	0.0324	0.0324	0.0324	0.0324	0.0324	0.0324	0.0324	0.0324
T 8154(150)	8.71	7.21	1.495E-03	0.0304	0.0304	0.0304	0.0304	0.0304	0.0304	0.0304	0.0304	0.0304
M 3962(150)	8.71	7.21	1.495E-03	0.0304	0.0304	0.0304	0.0304	0.0304	0.0304	0.0304	0.0304	0.0304
LS 1931(150)	8.71	7.21	1.495E-03	0.0304	0.0304	0.0304	0.0304	0.0304	0.0304	0.0304	0.0304	0.0304
US 1920(150)	8.71	7.21	1.495E-03	0.0304	0.0304	0.0304	0.0304	0.0304	0.0304	0.0304	0.0304	0.0304
T 1955(150)	9.79	8.29	1.395E-03	0.0284	0.0284	0.0284	0.0284	0.0284	0.0284	0.0284	0.0284	0.0284
M 3963(150)	9.79	8.29	1.395E-03	0.0284	0.0284	0.0284	0.0284	0.0284	0.0284	0.0284	0.0284	0.0284
US 1911(150)	9.81	8.31	1.395E-03	0.0284	0.0284	0.0284	0.0284	0.0284	0.0284	0.0284	0.0284	0.0284
LS 2194(150)	9.81	8.31	1.395E-03	0.0284	0.0284	0.0284	0.0284	0.0284	0.0284	0.0284	0.0284	0.0284
T 1956(150)	10.86	9.36	1.312E-03	0.0267	0.0267	0.0267	0.0267	0.0267	0.0267	0.0267	0.0267	0.0267
M 1956(150)	10.86	9.36	1.312E-03	0.0267	0.0267	0.0267	0.0267	0.0267	0.0267	0.0267	0.0267	0.0267
US 1912(150)	10.86	9.36	1.312E-03	0.0267	0.0267	0.0267	0.0267	0.0267	0.0267	0.0267	0.0267	0.0267
LS 2195(150)	10.86	9.36	1.312E-03	0.0267	0.0267	0.0267	0.0267	0.0267	0.0267	0.0267	0.0267	0.0267
T 1957(150)	11.56	10.44	1.241E-03	0.0253	0.0253	0.0253	0.0253	0.0253	0.0253	0.0253	0.0253	0.0253
M 1957(150)	11.56	10.44	1.241E-03	0.0253	0.0253	0.0253	0.0253	0.0253	0.0253	0.0253	0.0253	0.0253
US 1913(150)	11.56	10.44	1.241E-03	0.0253	0.0253	0.0253	0.0253	0.0253	0.0253	0.0253	0.0253	0.0253
LS 2196(150)	11.56	10.44	1.241E-03	0.0253	0.0253	0.0253	0.0253	0.0253	0.0253	0.0253	0.0253	0.0253
T 1958(150)	13.04	11.54	1.142E-03	0.0241	0.0241	0.0241	0.0241	0.0241	0.0241	0.0241	0.0241	0.0241
M 1958(150)	13.04	11.54	1.142E-03	0.0241	0.0241	0.0241	0.0241	0.0241	0.0241	0.0241	0.0241	0.0241
US 1917(150)	13.04	11.54	1.142E-03	0.0241	0.0241	0.0241	0.0241	0.0241	0.0241	0.0241	0.0241	0.0241
LS 2197(150)	13.07	11.56	1.141E-03	0.0240	0.0240	0.0240	0.0240	0.0240	0.0240	0.0240	0.0240	0.0240
T 1959(150)	14.12	12.61	1.130E-03	0.0230	0.0230	0.0230	0.0230	0.0230	0.0230	0.0230	0.0230	0.0230
M 1959(150)	14.12	12.61	1.130E-03	0.0230	0.0230	0.0230	0.0230	0.0230	0.0230	0.0230	0.0230	0.0230
US 1918(150)	14.12	12.61	1.130E-03	0.0230	0.0230	0.0230	0.0230	0.0230	0.0230	0.0230	0.0230	0.0230
LS 2198(150)	14.12	12.61	1.129E-03	0.0230	0.0230	0.0230	0.0230	0.0230	0.0230	0.0230	0.0230	0.0230
T 1960(150)	14.14	12.61	1.129E-03	0.0230	0.0230	0.0230	0.0230	0.0230	0.0230	0.0230	0.0230	0.0230

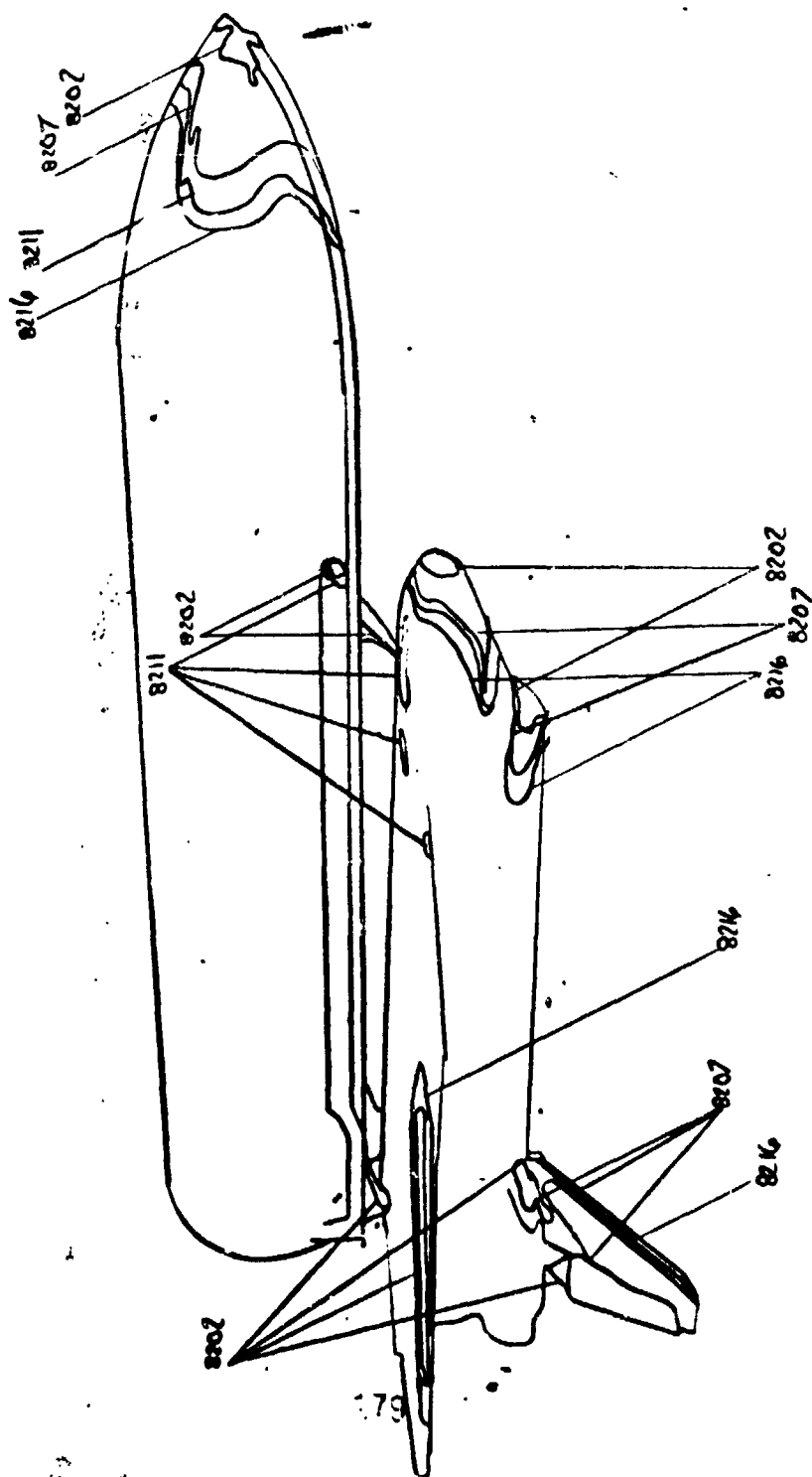
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NASA-R1 ORBITER HEATING  
 VA289  
 AEDC(ARO, INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 56 INCH HYPERSONIC TUNNEL R

GROUP CONFIG MODEL MACH NO PG(PSIA) TO( DEG R) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREBEND ROLL-MODEL YAW  
 22 1 1 4.00 860.8 1351 -.02 .02 0 180.00 -.00  
 T-INF P-INF Q-INF V-INF MU-INF RMQ-INF MU-INF RE/FT MREF STREF  
 (DEG R) (PSIA) (PSIA) (FT/SFC) (SLUGS/FT3) (LB-SEC/FT2) (FT-1) (R=.0175FT) (R=.0175FT)  
 97.9 .088 3.950 3879 7.557E-05 7.802E-08 3.719E 06 4.914E-02 2.105E-02  
 CAMERA ROLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RH0XCXK) TBAR(TO) BETA(TO)  
 TOP(T) R10R 81 -.0496 8.5 E-02 8.0938E-02  
 UPPER SIDE(US) 8244  
 LOWER SIDE(LS) 8495  
 ROTTCM(R) 7681

PIC NO	TIME DELTIME	M(TO)	M(TO)/MREF	M(.9TO)	M(.9TO)/MREF	M(.85TO)	M(.85TO)/MREF	ST(TO)
T 8160(150)	15.19 13.69	1.085E-03	.0221	1.322E-03	.0269	1.484E-03	.0302	4.604E-04
A 3964(150)	15.19 13.69	1.045E-03	.0221	1.322E-03	.0269	1.484E-03	.0302	4.604E-04
LS 2199(150)	15.19 13.69	1.045E-03	.0221	1.322E-03	.0269	1.484E-03	.0302	4.604E-04
US 8194(150)	15.22 13.71	1.084E-03	.0221	1.321E-03	.0269	1.483E-03	.0302	4.599E-04
T 8161(150)	16.27 14.77	1.045E-03	.0213	1.273E-03	.0259	1.429E-03	.0291	4.432E-04
A 3669(150)	16.27 14.77	1.045E-03	.0213	1.273E-03	.0259	1.429E-03	.0291	4.432E-04
LS 8197(150)	16.29 14.79	1.044E-03	.0212	1.272E-03	.0259	1.428E-03	.0291	4.429E-04
US 2200(150)	16.29 14.79	1.044E-03	.0212	1.272E-03	.0259	1.428E-03	.0291	4.429E-04
T 8162(150)	17.34 15.84	1.009E-03	.0205	1.229E-03	.0250	1.379E-03	.0281	4.280E-04
A 3970(150)	17.34 15.84	1.009E-03	.0205	1.229E-03	.0250	1.379E-03	.0281	4.280E-04
LS 8194(150)	17.37 15.87	1.008E-03	.0205	1.228E-03	.0250	1.378E-03	.0280	4.275E-04
US 2201(150)	17.37 15.87	1.008E-03	.0205	1.228E-03	.0250	1.378E-03	.0280	4.275E-04
MODEL HAS LEFT CENTERLINE								
T 8163(150)	18.42 16.92	9.740E-04	.0199	1.189E-03	.0242	1.335E-03	.0272	4.142E-04
A 3971(150)	18.42 16.92	9.760E-04	.0199	1.189E-03	.0242	1.335E-03	.0272	4.142E-04
LS 2202(150)	18.42 16.92	9.760E-04	.0199	1.189E-03	.0242	1.335E-03	.0272	4.142E-04
US 8199(150)	18.45 16.94	9.753E-04	.0199	1.188E-03	.0242	1.334E-03	.0271	4.139E-04

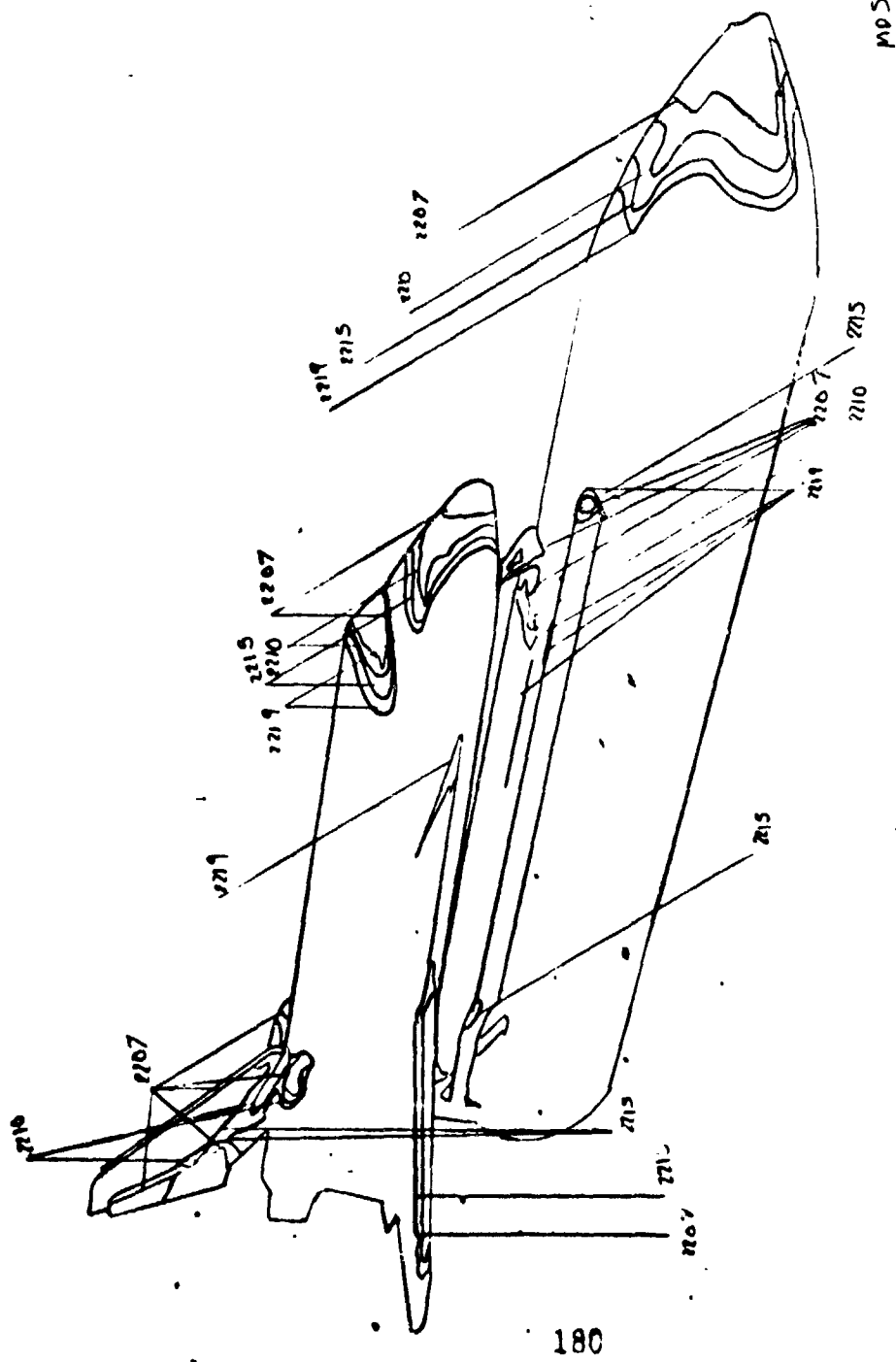


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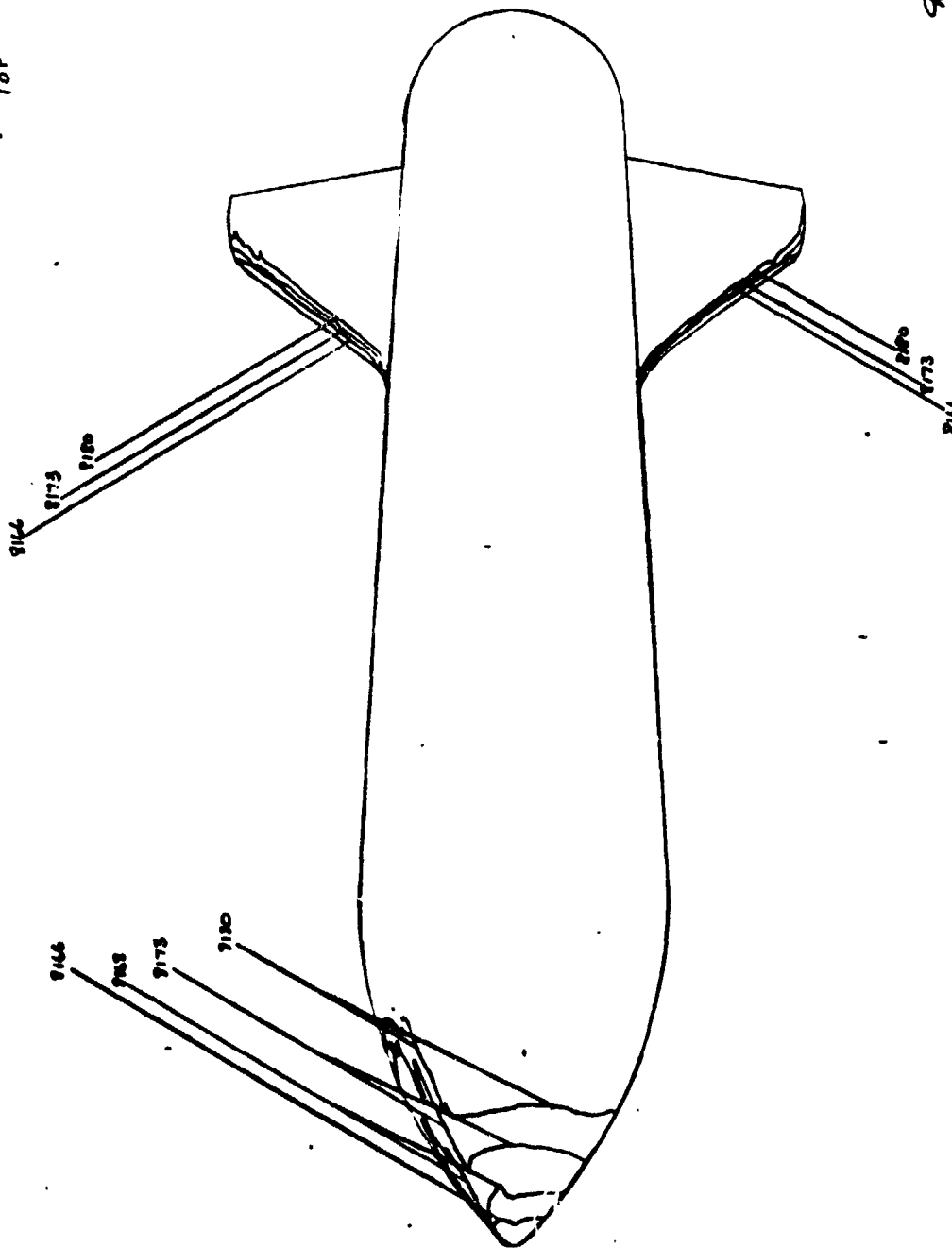


8495  
GP 23  
Low  
Side



Q108  
GP23  
TOP

M.2.



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6/29/73

AEDC(AROT, INC.) ARNOLD AFS, TENNESSEE  
VON KARMAN GAS DYNAMICS FACILITY  
50 INCH HYPERSONIC TUNNEL A

NASA-RI ORBITER HEATING

VA209

GROUP CONFIG MODEL MACH NO PO(PSIA) TO( DEG R) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREBEND ROLL-MODEL YAW  
21 1 1 8.00 857.3 1353 -5.02 5.02 0 180.00 --0.00

T-INF P-INF Q-INF V-INF MU-INF RU-INF ST/FT HREF ST/FT  
(DEG R) (PSIA) (FT/SEC) (SLUGS/FT<sup>3</sup>) (LP-SEC/FT<sup>2</sup>) (FT-1) (R= .0175FT) (R= .0175FT)

98.1 .088 3.934 3882 7.512E-05 7.896E-08 3.693E 06 4.906E-02 2.112E-02

CAMERA ROLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHOXCK) TRAR(10) BETA(10)

TOP(T) 8108 350 81 .0550 0 0

UPPER SINE(US) 8244

LOWER SINE(LS) 8495

ROT(10) 7681

PIC NO TIME DELTIME H(TO) H(TO)/HREF H(.910) H(.85TO) H(.85TO)/HREF ST(10)  
M 3972(150) 1.15 MODEL HAS NOT REACHED CENTERLINE  
T 3164(150) 1.18 MODEL HAS NOT REACHED CENTERLINE  
US 2202(150) 1.18 MODEL HAS NOT REACHED CENTERLINE  
LS 2203(150) 1.18 MODEL HAS NOT REACHED CENTERLINE  
M 3973(150) 2.25 MODEL HAS NOT REACHED CENTERLINE  
LS 2204(150) 2.25 MODEL HAS NOT REACHED CENTERLINE  
US 2201(150) 2.28 MODEL HAS NOT REACHED CENTERLINE

INJECT TIME = 2.6M

T 3164(150) 3.23 1.87 1.641E-02 .3345 2.139E-02 .4361 2.526E-02 .5150 6.920E-03  
M 3974(150) 3.23 1.87 1.641E-02 .3345 2.139E-02 .4361 2.526E-02 .5150 6.920E-03  
US 2202(150) 3.23 1.87 1.630E-02 .3322 2.128E-02 .4332 2.509E-02 .5116 6.874E-03  
LS 2205(150) 3.23 1.87 1.630E-02 .3322 2.128E-02 .4332 2.509E-02 .5116 6.874E-03  
T 3167(150) 4.43 2.97 1.245E-02 .2642 1.690E-02 .3645 1.995E-02 .4068 5.466E-03  
US 2203(150) 4.43 2.97 1.245E-02 .2642 1.690E-02 .3645 1.995E-02 .4068 5.466E-03  
M 3975(150) 4.43 2.97 1.245E-02 .2642 1.690E-02 .3645 1.995E-02 .4068 5.466E-03  
LS 2204(150) 4.43 2.97 1.245E-02 .2642 1.690E-02 .3645 1.995E-02 .4068 5.466E-03  
US 2201(150) 4.43 2.97 1.245E-02 .2642 1.690E-02 .3645 1.995E-02 .4068 5.466E-03  
M 3976(150) 5.51 4.00 1.108E-02 .2259 1.445E-02 .2046 1.706E-02 .3478 4.674E-03  
LS 2205(150) 5.51 4.00 1.108E-02 .2259 1.445E-02 .2046 1.706E-02 .3478 4.674E-03  
US 2202(150) 5.51 4.00 1.108E-02 .2259 1.445E-02 .2046 1.706E-02 .3478 4.674E-03  
M 3977(150) 5.53 4.00 1.108E-02 .2259 1.445E-02 .2046 1.706E-02 .3478 4.674E-03  
LS 2204(150) 5.53 4.00 1.108E-02 .2259 1.445E-02 .2046 1.706E-02 .3478 4.674E-03  
US 2201(150) 5.53 4.00 1.108E-02 .2259 1.445E-02 .2046 1.706E-02 .3478 4.674E-03  
M 3978(150) 6.58 5.00 9.836E-03 .2004 1.293E-02 .2615 1.515E-02 .3088 4.150E-03  
LS 2205(150) 6.58 5.00 9.836E-03 .2004 1.293E-02 .2615 1.515E-02 .3088 4.150E-03  
US 2202(150) 6.58 5.00 9.836E-03 .2004 1.293E-02 .2615 1.515E-02 .3088 4.150E-03  
M 3979(150) 7.66 6.16 8.915E-03 .1922 1.145E-02 .2175 1.376E-02 .2405 3.770E-03  
LS 2204(150) 7.66 6.16 8.915E-03 .1922 1.145E-02 .2175 1.376E-02 .2405 3.770E-03

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6/29/73

AEDC(ARPO, INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL R

NASA-RI ORBITER HEATING  
 VA289

GROUP 23 CONFIG 1 MODEL MATED MACH NO 8.00 POLPSIA) TO( DEG R) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREBEND ROLL-MODEL YAW  
 T-INF P-INF Q-INF V-INF MU-INF RE/FT MREF STREF  
 (DEG R) (PSIA) (FT/SFC) (SLUGS/FT) (LB-SEC/FT) (FT-1) (R= .0175FT) (R= .0175FT)  
 92.1 .088 3.933 3882 7.509E-05 7.897E-08 3.691E 06 4.905E-02 2.112E-02

CAMERA ROLL NO PAINT (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHOXCK) TBAR(TO) BETA(TO)  
 TOP(T) 810R 81 .0550 3.310E-01 4.0303E-01  
 UPPER SIDE(US) 8244  
 LOWER SIDE(LS) 8495  
 BOTTOM(MR) 7681

PIC NO	TIME DELTIME	H(TO)	M(TU)/MREF	H(.910)	M(.910)/MREF	H(.8510)	M(.8510)/MREF	ST(TO)
T 8170(150)	7.68	8.917E-03	.1818	1.163E-02	.2371	1.373E-02	.2799	3.762E-03
US 9204(150)	7.68	8.917E-03	.1818	1.163E-02	.2371	1.373E-02	.2799	3.762E-03
T 8171(150)	8.74	8.243E-03	.1681	1.075E-02	.2102	1.269E-02	.2588	3.478E-03
M 3679(150)	8.74	8.243E-03	.1681	1.075E-02	.2102	1.269E-02	.2588	3.478E-03
LS 2210(150)	8.74	8.243E-03	.1681	1.075E-02	.2102	1.269E-02	.2588	3.478E-03
US 2207(150)	8.76	8.243E-03	.1678	1.073E-02	.2102	1.267E-02	.2584	3.473E-03
T 8172(150)	9.81	7.641E-03	.1568	1.003E-02	.2044	1.184E-02	.2414	3.244E-03
M 3980(150)	9.81	7.641E-03	.1568	1.003E-02	.2044	1.184E-02	.2414	3.244E-03
LS 2211(150)	9.81	7.641E-03	.1568	1.003E-02	.2044	1.184E-02	.2414	3.244E-03
US 2204(150)	9.84	7.679E-03	.1564	1.001E-02	.2041	1.182E-02	.2411	3.239E-03
T 8173(150)	10.89	7.235E-03	.1475	9.436E-03	.1924	1.114E-02	.2272	3.052E-03
US 2205(150)	10.89	7.235E-03	.1475	9.436E-03	.1924	1.114E-02	.2272	3.052E-03
M 3481(150)	10.89	7.235E-03	.1475	9.436E-03	.1924	1.114E-02	.2272	3.052E-03
LS 2212(150)	10.89	7.235E-03	.1475	9.436E-03	.1924	1.114E-02	.2272	3.052E-03
T 8174(150)	11.56	6.844E-03	.1397	8.937E-03	.1822	1.055E-02	.2152	2.892E-03
M 3982(150)	11.56	6.844E-03	.1397	8.937E-03	.1822	1.055E-02	.2152	2.892E-03
LS 2213(150)	11.56	6.844E-03	.1397	8.937E-03	.1822	1.055E-02	.2152	2.892E-03
US 2210(150)	11.59	6.844E-03	.1396	8.924E-03	.1820	1.054E-02	.2149	2.889E-03
T 8175(150)	13.04	6.526E-03	.1331	8.510E-03	.1735	1.005E-02	.2049	2.754E-03
M 3983(150)	13.04	6.526E-03	.1331	8.510E-03	.1735	1.005E-02	.2049	2.754E-03
LS 2214(150)	13.07	6.519E-03	.1329	8.501E-03	.1733	1.004E-02	.2047	2.750E-03
US 2211(150)	14.14	6.235E-03	.1272	8.131E-03	.1658	9.601E-03	.1958	2.632E-03
T 8176(150)	14.14	6.235E-03	.1272	8.131E-03	.1658	9.601E-03	.1958	2.632E-03
M 3984(150)	14.14	6.235E-03	.1272	8.131E-03	.1658	9.601E-03	.1958	2.632E-03
LS 2215(150)	14.14	6.235E-03	.1272	8.131E-03	.1658	9.601E-03	.1958	2.632E-03

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NASA-RI ORBITER HEATING

AEDC(ARO-INC.) ARNOLD AFS, TENNESSEE  
 VOM KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL R

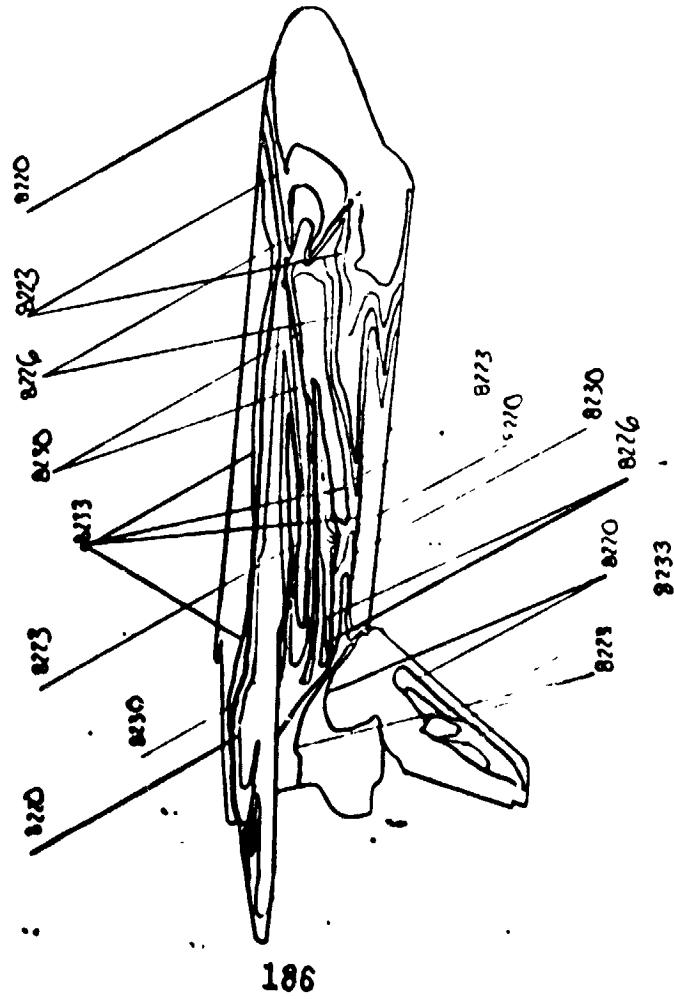
VA2R9

GROUP CONFIG MODEL MACH NO PO(PSIA) TO(DEG R) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREBEND ROLL-MODEL YAW  
 23 1 9.00 856.7 1353 -5.02 5.02 0 180.00 -0.00  
 T-1AF P-INF Q-INF V-INF MU-INF RMU-INF RE/FT MREF STREF  
 (DEG R) (PSIA) (PSIA) (FT/SFC) (SLUGS/FT3) (LR-SEC/FT2) (FT-1) (R= .0175FT) (R= .0175FT)  
 9P.1 .008 3.931 3082 7.507E-05 7.896E-08 3.691E 06 4.904E-02 2.113E-02  
 CAMERA ROLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RMUXCK) YBAU(TO) BETA(TO)  
 TOP(T) 8108 81  
 UPPER SINE(US) 8244 .0550  
 LOWER SINE(LS) 8495  
 BOTTOM(M) 7681 3.310E-01 4.0303E-01

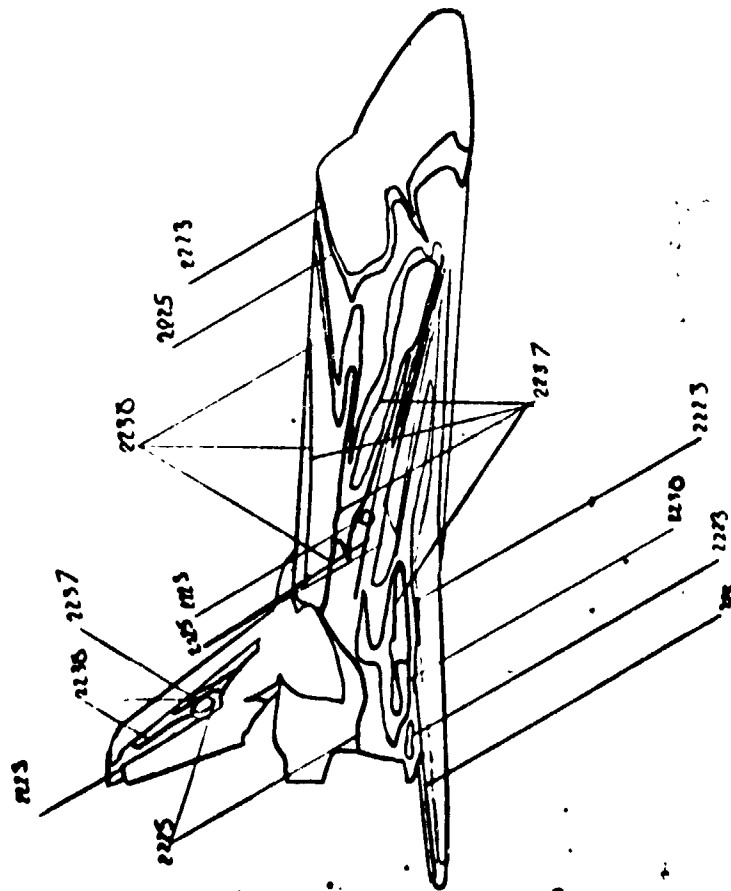
PTC NO	TIME	MELTIME	H(TO)	HREF	H(9TO)	HREF	H(85TO)	HREF	ST(TO)
T 0177(150)	15.14	13.64	6.002E-03	.1224	7.827E-03	.1596	9.242E-03	.1885	2.532E-03
M 3985(150)	15.14	13.64	6.002E-03	.1224	7.827E-03	.1596	9.242E-03	.1885	2.532E-03
LS 0213(150)	15.17	13.64	5.997E-03	.1223	7.820E-03	.1594	9.234E-03	.1883	2.530E-03
T 0178(150)	15.17	13.64	5.997E-03	.1223	7.820E-03	.1594	9.234E-03	.1883	2.530E-03
M 3986(150)	16.22	14.72	5.779E-03	.1178	7.535E-03	.1536	8.898E-03	.1814	2.438E-03
LS 0214(150)	16.22	14.72	5.779E-03	.1177	7.529E-03	.1535	8.898E-03	.1814	2.438E-03
T 0179(150)	16.24	14.74	5.774E-03	.1177	7.529E-03	.1535	8.898E-03	.1813	2.436E-03
M 3987(150)	17.29	15.79	5.578E-03	.1137	7.274E-03	.1483	8.589E-03	.1751	2.354E-03
LS 0215(150)	17.29	15.79	5.578E-03	.1137	7.274E-03	.1483	8.589E-03	.1751	2.354E-03
T 0180(150)	17.32	15.82	5.574E-03	.1137	7.268E-03	.1482	8.582E-03	.1750	2.352E-03
M 3988(150)	18.37	16.87	5.347E-03	.1101	7.038E-03	.1435	8.311E-03	.1695	2.278E-03
LS 0216(150)	18.37	16.87	5.347E-03	.1101	7.038E-03	.1435	8.311E-03	.1695	2.278E-03
T 0181(150)	18.40	16.89	5.343E-03	.1100	7.033E-03	.1434	8.305E-03	.1693	2.276E-03
M 3989(150)	19.45	17.94	5.233E-03	.1057	6.824E-03	.1391	8.058E-03	.1643	2.207E-03
LS 0220(150)	19.45	17.94	5.233E-03	.1057	6.824E-03	.1391	8.058E-03	.1643	2.207E-03
T 0182(150)	19.47	17.97	5.229E-03	.1056	6.819E-03	.1390	8.052E-03	.1642	2.206E-03

MODEL WAS LEFT CENTERLINE

8244  
GP 24  
Upper Side



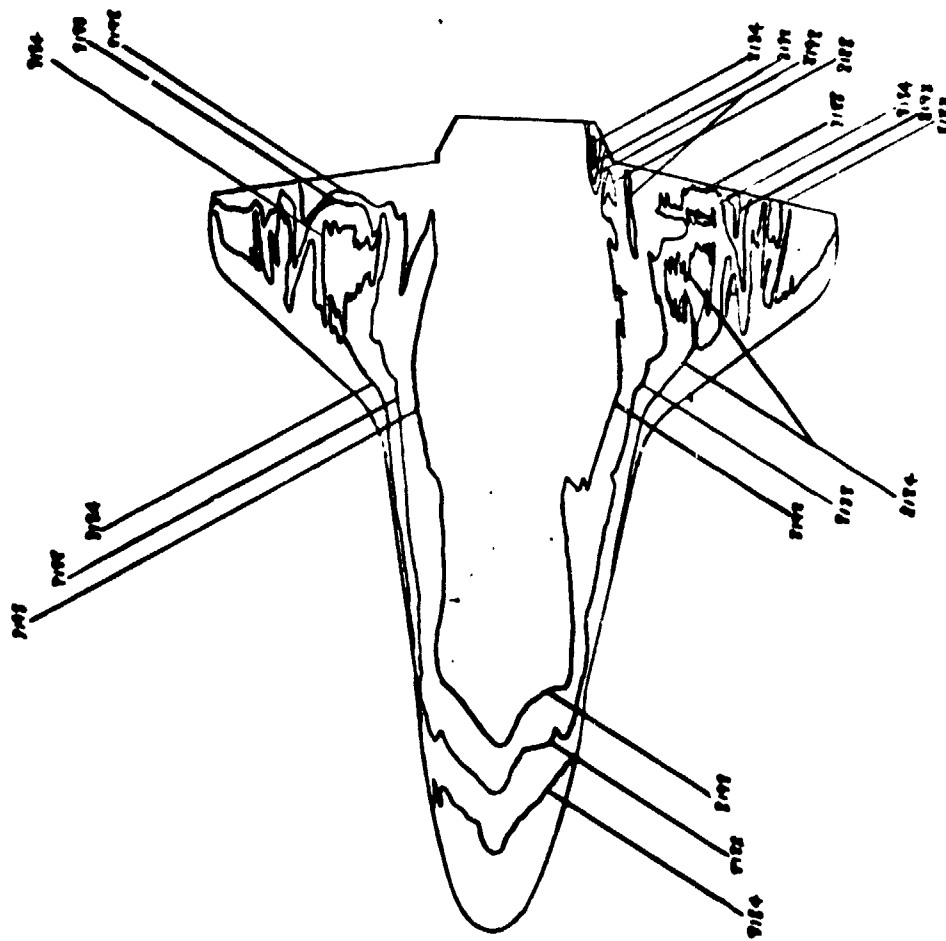
8495  
CP 24  
Lower  
Side

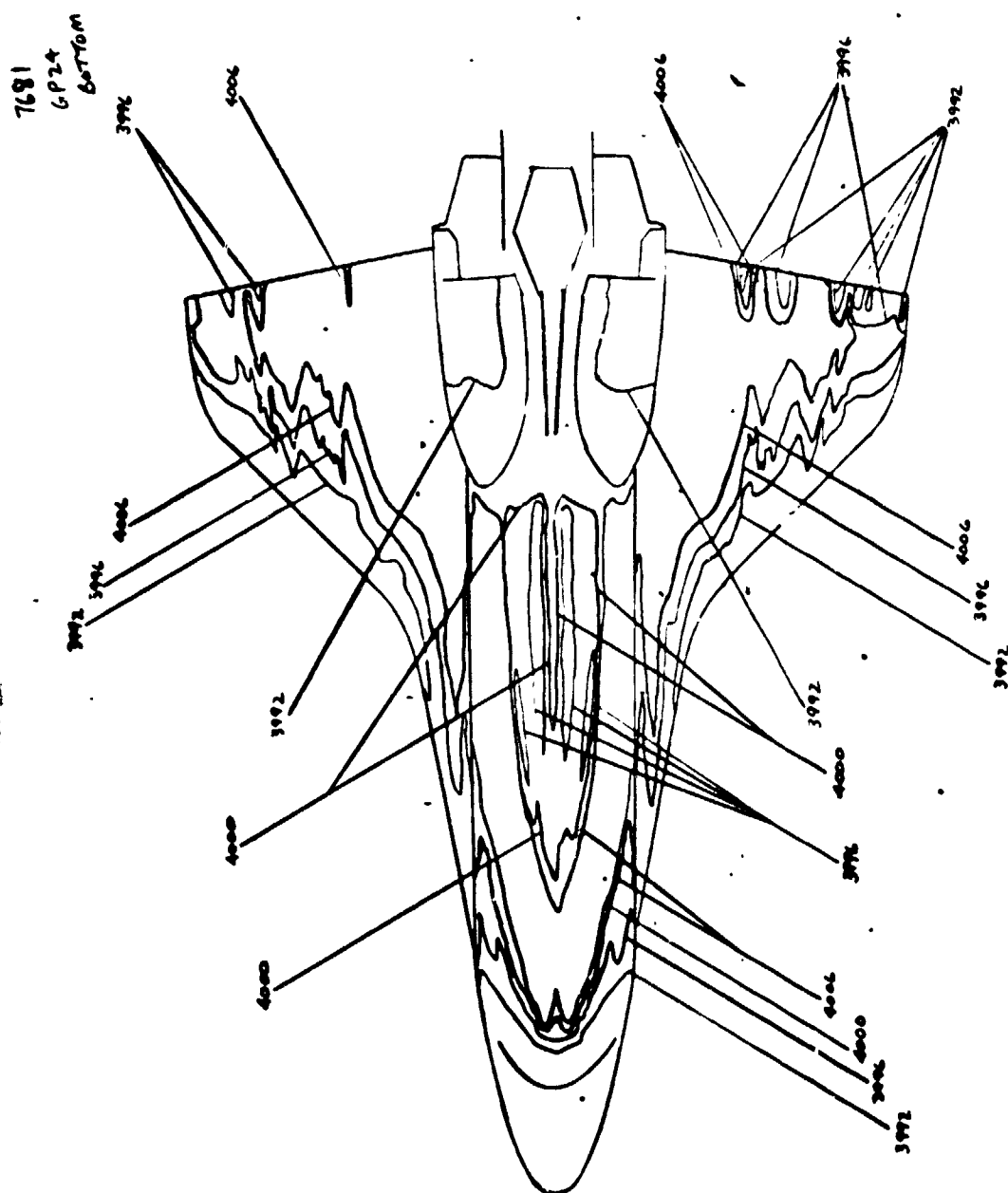




P108  
GP24  
TOP

M.A.





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 6/29/73

NASA-BI WRITER PEATING

AEDC(ARO-INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL B

VA204

GROUP CMPT6 MODEL MACH NO PO(PSIA) TO(EG R) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREBEND ROLL-MODEL YAW  
 24 2 ORBITER S 4.00 858.6 1353 -.01 .01 .01 100.00 -.00

T-1NF 0-1NF 0-1NF V-1NF MU-1NF RE/FT HREF STREF  
 (DEG R) (PSIA) (FT/SEC) (SEC/FT) (FT-1) (R= .0175FT) (R= .0175FT)  
 90.0 .002 3.940 3001 7.851E-05 7.851E-08 3.702E 06 4.909E-02 2.109E-02

CAMERA ROLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHO/CAN) TRAR(TO) BETAI(TO)

TOP(FT) 8108 AS .0426 0 0

UPPER SING(US) 8244  
 LOWER SING(US) 8495  
 MOTION(R) 7601

PIC NO	TIME DELTIME	M(TO)	M(TO)/HREF	M(.9TO)	M(.9TO)/HREF	M(.85TO)	M(.85TO)/HREF	ST(10)
1 3090(131)	1.15	MODEL WAS NOT REACHED CENTERLINE						
1 3102(131)	1.18	MODEL WAS NOT REACHED CENTERLINE						
US 221(131)	1.10	MODEL WAS NOT REACHED CENTERLINE						
LS 222(131)	1.10	MODEL WAS NOT REACHED CENTERLINE						
1 3103(131)	2.25	MODEL WAS NOT REACHED CENTERLINE						
US 221(131)	2.25	MODEL WAS NOT REACHED CENTERLINE						
LS 222(131)	2.25	MODEL WAS NOT REACHED CENTERLINE						
IMJCT TIME = 2.64								
1 3104(131)	3.33	1.501E-03	.0307	2.304E-03	.0470	2.500E-03	.0526	8.099E-04
1 3105(131)	3.33	1.501E-03	.0307	2.304E-03	.0470	2.500E-03	.0526	8.099E-04
LS 222(131)	3.33	1.501E-03	.0307	2.304E-03	.0470	2.500E-03	.0526	8.099E-04
US 221(131)	3.35	1.501E-03	.0307	2.304E-03	.0470	2.500E-03	.0526	8.099E-04
1 3106(131)	4.41	1.501E-03	.0307	2.304E-03	.0470	2.500E-03	.0526	8.099E-04
US 221(131)	4.41	1.501E-03	.0307	2.304E-03	.0470	2.500E-03	.0526	8.099E-04
LS 222(131)	4.41	1.501E-03	.0307	2.304E-03	.0470	2.500E-03	.0526	8.099E-04
1 3107(131)	5.49	1.501E-03	.0307	2.304E-03	.0470	2.500E-03	.0526	8.099E-04
US 221(131)	5.49	1.501E-03	.0307	2.304E-03	.0470	2.500E-03	.0526	8.099E-04
LS 222(131)	5.49	1.501E-03	.0307	2.304E-03	.0470	2.500E-03	.0526	8.099E-04
1 3108(131)	6.57	1.501E-03	.0307	2.304E-03	.0470	2.500E-03	.0526	8.099E-04
US 221(131)	6.57	1.501E-03	.0307	2.304E-03	.0470	2.500E-03	.0526	8.099E-04
LS 222(131)	6.57	1.501E-03	.0307	2.304E-03	.0470	2.500E-03	.0526	8.099E-04
1 3109(131)	7.63	1.501E-03	.0307	2.304E-03	.0470	2.500E-03	.0526	8.099E-04
US 221(131)	7.63	1.501E-03	.0307	2.304E-03	.0470	2.500E-03	.0526	8.099E-04
LS 222(131)	7.63	1.501E-03	.0307	2.304E-03	.0470	2.500E-03	.0526	8.099E-04

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AEOLIAN, INC.) ARNOLD AFS, TENNESSEE  
VON KARMAN GAS DYNAMICS FACILITY  
. 50 INCH HYPERSONIC TUNNEL A

ONLY A V34 SERIAL IS-V554

6027A

GROUP	CNFG	MODEL	MACH NO	PROPSIA	TO(EG R)	ALPHA-MODEL	ALPHA-SECTOR	ALPHA-PREBEND	ROLL-MODEL	YAW
24	2	ONEITEM S	0.00	MSA.5	1953	-.01		0	180.00	-.00

T-1AF	D-1AF	G-1AF	V-1AF	BW-1AF	WU-1AF	RE/FT	WREF	STREF
(DCR R)	(DCR A)	(PSIA)	(FT/SFC)	(SLINGS/FT)	(LB-SEC/FT)	(FT-1)	(R = .0175FT)	(R = .0175FT)
00.0	.000	3.940	3001	7.420E-05	7.0V1E-08	3.702E 06	4.908E-02	2.109E-02

CAMERA	ROLL NO	PARENT TEMP (DEG F)	INITIAL TEMP (DEG F)	SQUARE ROOT (RHOKCCK)	TBAR(TO)	BETA(TO)
1	1	100	100	10	100	100
2	2	100	100	10	100	100
3	3	100	100	10	100	100
4	4	100	100	10	100	100
5	5	100	100	10	100	100
6	6	100	100	10	100	100
7	7	100	100	10	100	100
8	8	100	100	10	100	100
9	9	100	100	10	100	100
10	10	100	100	10	100	100
11	11	100	100	10	100	100
12	12	100	100	10	100	100
13	13	100	100	10	100	100
14	14	100	100	10	100	100
15	15	100	100	10	100	100
16	16	100	100	10	100	100
17	17	100	100	10	100	100
18	18	100	100	10	100	100
19	19	100	100	10	100	100
20	20	100	100	10	100	100
21	21	100	100	10	100	100
22	22	100	100	10	100	100
23	23	100	100	10	100	100
24	24	100	100	10	100	100
25	25	100	100	10	100	100
26	26	100	100	10	100	100
27	27	100	100	10	100	100
28	28	100	100	10	100	100
29	29	100	100	10	100	100
30	30	100	100	10	100	100
31	31	100	100	10	100	100
32	32	100	100	10	100	100
33	33	100	100	10	100	100
34	34	100	100	10	100	100
35	35	100	100	10	100	100
36	36	100	100	10	100	100
37	37	100	100	10	100	100
38	38	100	100	10	100	100
39	39	100	100	10	100	100
40	40	100	100	10	100	100
41	41	100	100	10	100	100
42	42	100	100	10	100	100
43	43	100	100	10	100	100
44	44	100	100	10	100	100
45	45	100	100	10	100	100
46	46	100	100	10	100	100
47	47	100	100	10	100	100
48	48	100	100	10	100	100
49	49	100	100	10	100	100
50	50	100	100	10	100	100
51	51	100	100	10	100	100
52	52	100	100	10	100	100
53	53	100	100	10	100	100
54	54	100	100	10	100	100
55	55	100	100	10	100	100
56	56	100	100	10	100	100
57	57	100	100	10	100	100
58	58	100	100	10	100	100
59	59	100	100	10	100	100
60	60	100	100	10	100	100

131	05	0.0486	5.697E-02	5.2843E-02
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0496

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UPEE SINE(US)	0246
LOWEE SINE(LS)	0695
MOYCN(M)	7481

PIC NO	TYPE	DELTIME	M(TOI)	M(TOI)/MREF	M(TOI)	M(TOI)/MREF	M1.85(TOI)	M(.85TOI)/MREF	ST(TOI)
T 0100(131)	7.66	6.16	1.035E-03	.0211	1.256E-03	.0256	1.405E-03	.0286	4.410E-04
US 2224(131)	7.66	6.14	1.035E-03	.0211	1.256E-03	.0256	1.405E-03	.0286	4.410E-04
LS 2224(131)	7.66	6.16	1.035E-03	.0211	1.256E-03	.0256	1.405E-03	.0286	4.410E-04
T 0109(131)	8.74	7.23	9.550E-04	.0195	1.159E-03	.0236	1.296E-03	.0264	4.069E-04
US 2225(131)	8.74	7.23	9.550E-04	.0195	1.159E-03	.0236	1.296E-03	.0264	4.069E-04
M 3007(131)	8.74	7.23	9.550E-04	.0195	1.159E-03	.0236	1.296E-03	.0264	4.069E-04
LS 2224(131)	8.74	7.23	9.550E-04	.0195	1.159E-03	.0236	1.296E-03	.0264	4.069E-04
T 0109(131)	9.81	8.31	8.910E-04	.0182	1.091E-03	.0220	1.209E-03	.0246	3.797E-04
M 3008(131)	9.81	8.31	8.910E-04	.0182	1.091E-03	.0220	1.209E-03	.0246	3.797E-04
LS 2224(131)	9.81	8.31	8.910E-04	.0182	1.091E-03	.0220	1.209E-03	.0246	3.797E-04
US 2224(131)	9.84	8.31	8.910E-04	.0181	1.090E-03	.0220	1.209E-03	.0246	3.797E-04
T 0101(131)	10.69	9.38	8.344E-04	.0171	1.017E-03	.0207	1.139E-03	.0232	3.573E-04
M 3009(131)	10.69	9.38	8.344E-04	.0171	1.017E-03	.0207	1.139E-03	.0232	3.573E-04
LS 2224(131)	10.69	9.38	8.344E-04	.0171	1.017E-03	.0207	1.139E-03	.0232	3.573E-04
US 2227(131)	10.61	8.61	8.372E-04	.0171	1.016E-03	.0207	1.136E-03	.0232	3.568E-04
T 0102(131)	11.54	10.64	7.941E-04	.0162	9.634E-04	.0196	1.079E-03	.0220	3.396E-04
M 4000(131)	11.56	10.44	7.941E-04	.0162	9.634E-04	.0196	1.079E-03	.0220	3.396E-04
US 2224(131)	11.59	10.40	7.941E-04	.0162	9.623E-04	.0196	1.077E-03	.0219	3.372E-04
LS 2224(131)	11.59	10.40	7.941E-04	.0162	9.623E-04	.0196	1.077E-03	.0219	3.372E-04
T 0103(131)	13.07	11.54	7.533E-04	.0154	9.146E-04	.0187	1.025E-03	.0209	3.219E-04
US 2229(131)	13.07	11.54	7.533E-04	.0154	9.146E-04	.0187	1.025E-03	.0209	3.219E-04
M 4001(131)	13.07	11.54	7.533E-04	.0154	9.146E-04	.0187	1.025E-03	.0209	3.219E-04
LS 2232(131)	13.07	11.56	7.533E-04	.0154	9.166E-04	.0187	1.025E-03	.0209	3.219E-04
T 0104(131)	14.14	12.64	7.244E-04	.0147	8.765E-04	.0179	9.806E-04	.0200	3.078E-04
US 2230(131)	14.14	12.64	7.244E-04	.0147	8.765E-04	.0179	9.806E-04	.0200	3.078E-04
M 4002(131)	14.14	12.64	7.244E-04	.0147	8.765E-04	.0179	9.806E-04	.0200	3.078E-04
LS 2233(131)	14.14	12.64	7.244E-04	.0147	8.765E-04	.0179	9.806E-04	.0200	3.078E-04

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6/29/73

NASA-RI ORBITER HEATING

VA2R9

AEDC(AHO,INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL R

GROUP COMF16 MODEL MACH NO POISSIA) TO(DEG R) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREBEND ROLL-MODEL YAW  
 24 2 ORBITER S 8.00 A50.3 1352 -.01 .01 0 180.00 -.00

T-INF P-INF Q-INF V-INF MU-INF RHO-INF RE/FT MREF STREF  
 (DEG R) (PSIA) (FT/SFC) (SLUGS/FT3) (LH-SEC/F 2) (FT-1) (R=.0175FT) (R=.0175FT)  
 94.0 .088 3.939 3881 7.527E-05 7.890E-08 3.702E 04 4.903E-02 2.110E-02

CAMFRA ROLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHOXCK) TBAR(TO) BETA(TO)  
 TOP(T) 8108  
 UPPER SIDE(US) 8244  
 LOWER SIDE(LS) 8495  
 BOTTOM(B) 7681

AS .04RA 5.697E-02 5.2843E-02

PIC NO TIME DELTIME H(TO) HREF H(1TO) HREF H(1.85TO) HREF H(1.85TO) ST(TO)

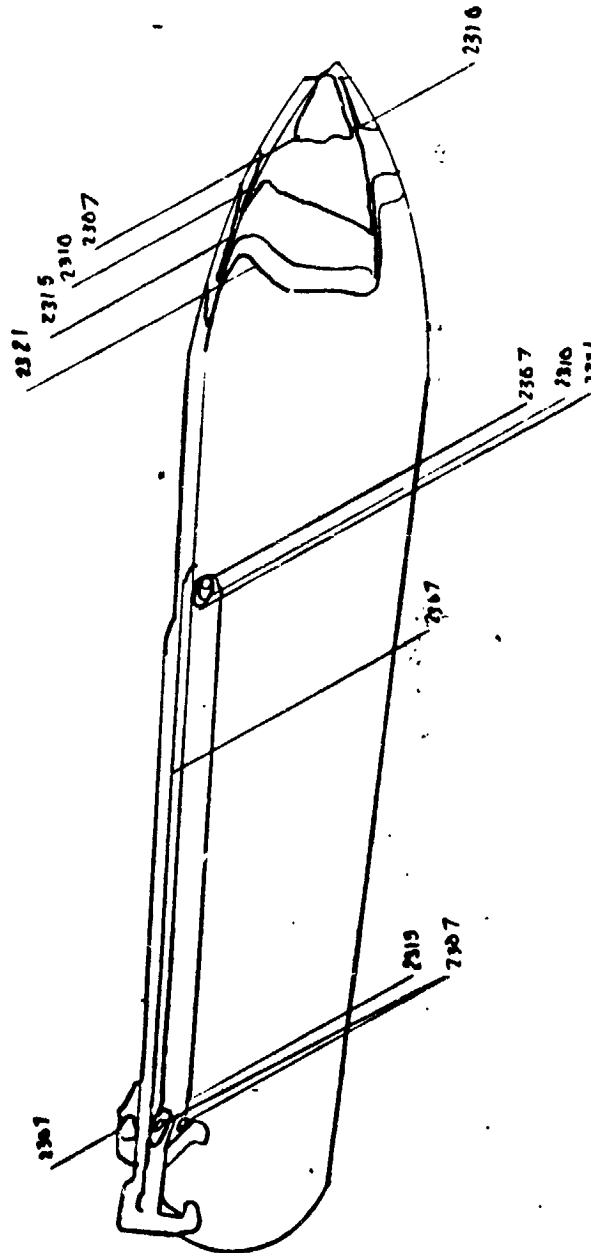
T 8195(131)	15.22	13.71	6.935E-04	.0141	8.414E-04	.0171	9.413E-04	.0192	2.955E-04
US 8211(131)	15.22	13.71	6.935E-04	.0141	8.414E-04	.0171	9.413E-04	.0192	2.955E-04
M 4003(131)	15.22	13.71	6.935E-04	.0141	8.414E-04	.0171	9.413E-04	.0192	2.955E-04
LS 2234(131)	15.22	13.71	6.935E-04	.0141	8.414E-04	.0171	9.413E-04	.0192	2.955E-04
T 8196(131)	16.29	14.79	6.678E-04	.0136	8.102E-04	.0165	9.064E-04	.0185	2.846E-04
M 4004(131)	16.29	14.79	6.678E-04	.0136	8.102E-04	.0165	9.064E-04	.0185	2.846E-04
LS 2235(131)	16.29	14.79	6.678E-04	.0136	8.102E-04	.0165	9.064E-04	.0185	2.846E-04
US 8232(131)	16.32	14.82	6.672E-04	.0136	8.066E-04	.0165	9.056E-04	.0185	2.846E-04
T 8197(131)	17.37	15.87	6.447E-04	.0131	7.823E-04	.0159	8.751E-04	.0178	2.748E-04
M 4005(131)	17.37	15.87	6.447E-04	.0131	7.823E-04	.0159	8.751E-04	.0178	2.748E-04
LS 2236(131)	17.37	15.87	6.447E-04	.0131	7.823E-04	.0159	8.751E-04	.0178	2.748E-04
US 8233(131)	17.40	15.89	6.442E-04	.0131	7.817E-04	.0159	8.744E-04	.0178	2.746E-04
T 8198(131)	18.45	16.94	6.239E-04	.0127	7.570E-04	.0154	8.469E-04	.0173	2.659E-04
M 4006(131)	18.45	16.94	6.239E-04	.0127	7.570E-04	.0154	8.469E-04	.0173	2.659E-04
LS 2237(131)	18.45	16.94	6.239E-04	.0127	7.570E-04	.0154	8.469E-04	.0173	2.659E-04
US 8234(131)	18.47	16.97	6.235E-04	.0127	7.565E-04	.0154	8.463E-04	.0172	2.657E-04
MODEL HAS LEFT CENTERLINE									
T 8199(131)	19.42	17.92	6.050E-04	.0123	7.341E-04	.0150	8.212E-04	.0167	2.579E-04
M 4007(131)	19.42	17.92	6.050E-04	.0123	7.341E-04	.0150	8.212E-04	.0167	2.579E-04
LS 2239(131)	19.42	17.92	6.050E-04	.0123	7.341E-04	.0150	8.212E-04	.0167	2.579E-04
US 8235(131)	19.45	17.94	6.046E-04	.0123	7.336E-04	.0149	8.206E-04	.0167	2.577E-04
T 8200(131)	20.40	19.10	5.877E-04	.0120	7.131E-04	.0145	7.977E-04	.0163	2.504E-04
M 4008(131)	20.40	19.10	5.877E-04	.0120	7.131E-04	.0145	7.977E-04	.0163	2.504E-04
LS 2236(131)	20.62	19.12	5.873E-04	.0120	7.126E-04	.0145	7.972E-04	.0162	2.503E-04
US 8239(131)	20.67	19.17	5.866E-04	.0120	7.117E-04	.0145	7.962E-04	.0162	2.499E-04

120

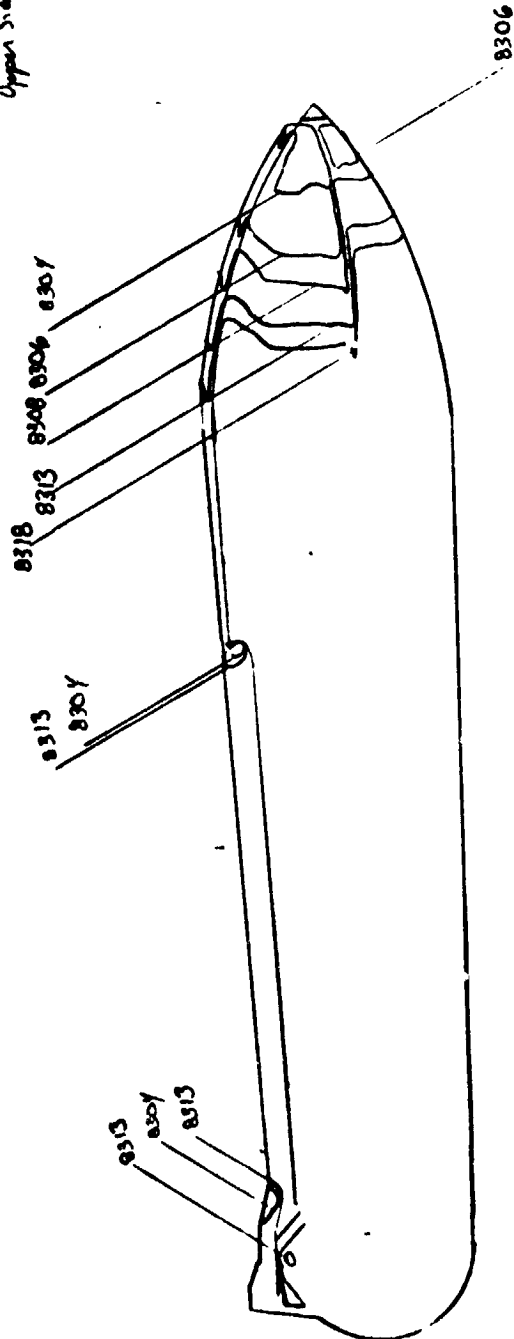
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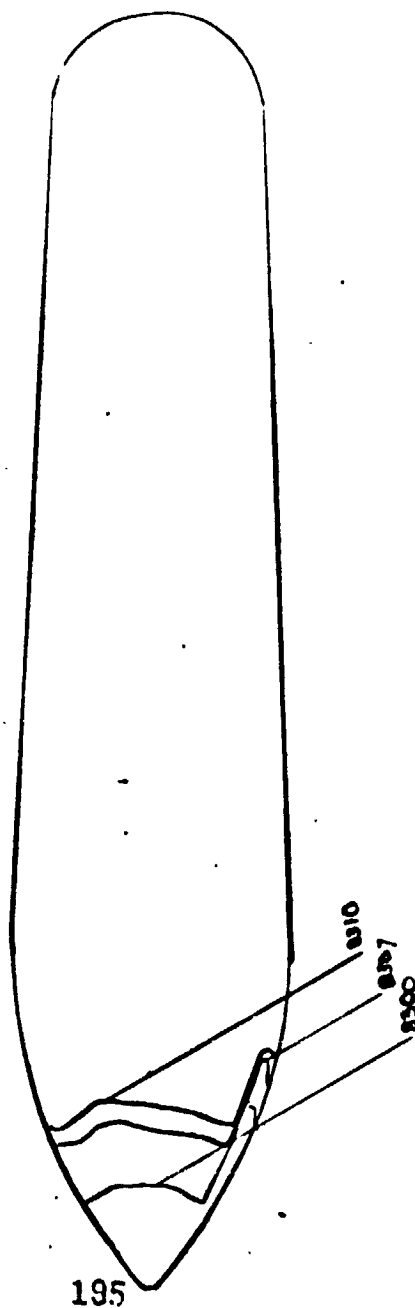
7637  
GP 25  
Lower Side



8049  
GP 25  
Upper Side

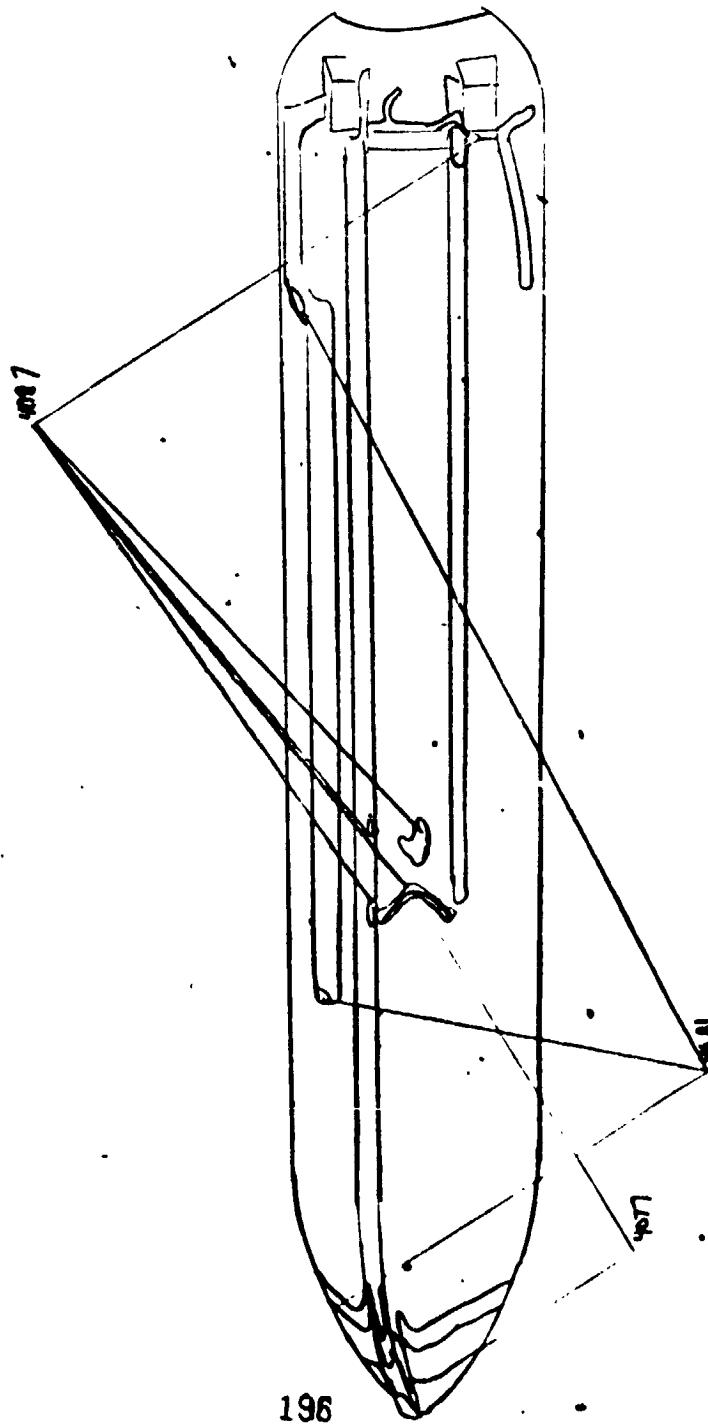


Group 25  
7855  
Top





Group 25  
Bottom  
MD  
7267



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6/29/73

MASA-RI ORBITER HEATING  
 VA209

AEDCIARO, INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL R

GROUP	CONFIG	MODEL	MACH NO	POISSIA)	TOIDEG R)	ALPHA-MODEL	ALPHA-SECTOR	ALPHA-PREBEND	ROLL-MODEL	YAW
25	R	TANK	8.00	862.1	1338	0	0	0	180.00	0
T-INF	Q-INF	Q-INF	V-INF	RHO-INF	MU-INF	HF/FT	HREF	STREF		
(DEGR)	(PSIA)	(FT/SFC)		(SLUGS/FT3)	(LP-SEC/FT2)	(FT-1)	(R-)	(M=)		
97.0	.088	3.956	1860	7.440E-05	7.807E-08	3.779E 06	4.909E-02	2.092F-02		
CAMERA	ROLL NO	PAINT TEMP (DEG F)	INITIAL TEMP (DEG F)	SQUARE R	Y (RHOACX)	TRAR(TO)	BETA(TO)			
TOP(T)	7855									
UPPER SINE(US)	8049									
LOWER SINE(LS)	7637									
BOTTOM(BS)	7267									

PIC NO	TIME DELTIME	H(TO)	H(TO)/HREF	H(.910)	H(.910)/HREF	H(.8510)	H(.8510)	REF	ST(TO)
T A294(100)	1.15	MODEL HAS NOT REACHED CENTERLINE		1.663E-02		1.935E-02		.3939	5.431E-03
M A074(100)	1.15	MODEL HAS NOT REACHED CENTERLINE		1.663E-02		1.935E-02		.3939	5.431E-03
LS 2305(100)	1.15	MODEL HAS NOT REACHED CENTERLINE		1.663E-02		1.935E-02		.3912	5.395E-03
US A002(100)	1.18	MODEL HAS NOT REACHED CENTERLINE		1.663E-02		1.935E-02		.3912	5.395E-03
T A295(100)	2.23	MODEL HAS NOT REACHED CENTERLINE		1.663E-02		1.935E-02		.3121	4.304E-03
M A075(100)	2.23	MODEL HAS NOT REACHED CENTERLINE		1.663E-02		1.935E-02		.3121	4.304E-03
US A303(100)	2.25	MODEL HAS NOT REACHED CENTERLINE		1.663E-02		1.935E-02		.3107	4.285E-03
LS 2306(100)	2.25	MODEL HAS NOT REACHED CENTERLINE		1.663E-02		1.935E-02		.3107	4.285E-03
INJECT TIME = 2.65									
T A296(100)	3.20	1.81	1.299E-02	.2645	1.663E-02	1.935E-02		.3939	5.431E-03
M A076(100)	3.20	1.81	1.299E-02	.2645	1.663E-02	1.935E-02		.3939	5.431E-03
US A704(100)	3.23	1.84	1.299E-02	.2627	1.663E-02	1.935E-02		.3912	5.395E-03
LS 2307(100)	3.23	1.84	1.299E-02	.2627	1.663E-02	1.935E-02		.3912	5.395E-03
T A297(100)	4.28	2.89	1.029E-02	.2696	1.317E-02	1.533E-02		.3121	4.304E-03
M A077(100)	4.28	2.89	1.029E-02	.2696	1.317E-02	1.533E-02		.3121	4.304E-03
US A304(100)	4.41	2.92	1.029E-02	.2687	1.317E-02	1.533E-02		.3107	4.285E-03
LS 2308(100)	4.41	2.92	1.029E-02	.2687	1.317E-02	1.533E-02		.3107	4.285E-03
T A298(100)	5.46	3.97	8.747E-03	.1790	1.125E-02	1.309E-02		.2665	3.676E-03
M A078(100)	5.46	3.97	8.747E-03	.1790	1.125E-02	1.309E-02		.2665	3.676E-03
US A305(100)	5.47	3.99	8.747E-03	.1784	1.121E-02	1.304E-02		.2657	3.666E-03
LS 2309(100)	5.48	3.99	8.747E-03	.1784	1.121E-02	1.304E-02		.2657	3.666E-03
T A299(100)	6.53	5.04	7.743E-03	.1587	9.974E-03	1.161E-02		.2363	3.259E-03
M A079(100)	6.53	5.04	7.743E-03	.1587	9.974E-03	1.161E-02		.2363	3.259E-03
US A307(100)	6.56	5.07	7.744E-03	.1583	9.949E-03	1.158E-02		.2357	3.251E-03
LS 2310(100)	6.56	5.07	7.744E-03	.1583	9.949E-03	1.158E-02		.2357	3.251E-03
T A300(100)	7.61	6.12	7.075E-03	.1441	9.054E-03	1.054E-02		.2145	2.959E-03
M A080(100)	7.61	6.12	7.075E-03	.1441	9.054E-03	1.054E-02		.2145	2.959E-03
LS 2311(100)	7.61	6.12	7.075E-03	.1441	9.054E-03	1.054E-02		.2145	2.959E-03

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6/29/73

AEDC(ARO-INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL R

NASA-R1 ORBITER HEATING

VA289

GROUP	CONFID	MODEL	TANK	MACH NO	PO(PISA)	TO(DEC R)	ALPHA-MODEL	ALPHA-SECTOR	ALPHA-PREBEND	ROLL-MODEL	YAW
25				R.00	R62.5	1338	0	0	0	180.00	0
T-INF	P-INF	Q-INF	V-INF	RHO-INF	WU-INF	RE/FT	HREF	STREF			
(DEC R)	(PISA)	(PSIA)	(FT/SEC)	(SLUGS/FT <sup>3</sup> )	(LB-SEC/FT <sup>2</sup> )	(FT-1)	(R= .0175FT)	(R= .0175FT)			
97.0	.088	3.958	3860	7.444E-05	7.807E-08	3.779E 06	4.911E-02	2.091E-02			
CAMERA	ROLL NO	PAINT TEMP (DEG F)	INITIAL TEMP (DEG F)	SQUARE ROOT (RHOXCKX)	TRAR(TO)	BETA(TO)					
TOP(T)	7655										
UPPER SIDE(US)	8049										
LOWER SIDE(LS)	7637										
MOT(TO4(R))	7267										

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PIC NO	TIME	MELTIME	M(TO)	M(TO)/HREF	M(.9TO)	M(.9TO)/HREF	M(.85TO)	M(.85TO)/HREF	ST(TO)
US A308(100)	7.63	6.14	7.061E-03	.1438	9.036E-03	.1840	1.051E-02	.2141	2.954E-03
M A081(100)	8.66	7.17	6.536E-03	.1330	8.364E-03	.1703	9.733E-03	.1981	2.732E-03
T A301(100)	8.68	7.20	6.525E-03	.1328	8.350E-03	.1700	9.716E-03	.1978	2.727E-03
US A309(100)	8.68	7.20	6.525E-03	.1328	8.350E-03	.1700	9.716E-03	.1978	2.727E-03
LS A312(100)	8.68	7.20	6.525E-03	.1328	8.350E-03	.1700	9.716E-03	.1978	2.727E-03
T A302(100)	9.74	8.25	6.094E-03	.1241	7.800E-03	.1588	9.075E-03	.1848	2.549E-03
M A082(100)	9.74	8.25	6.094E-03	.1241	7.800E-03	.1588	9.075E-03	.1848	2.549E-03
LS A313(100)	9.74	8.25	6.094E-03	.1241	7.800E-03	.1588	9.075E-03	.1848	2.549E-03
T A310(100)	9.76	8.27	6.085E-03	.1239	7.788E-03	.1586	9.062E-03	.1845	2.545E-03
M A083(100)	10.81	9.32	5.732E-03	.1167	7.336E-03	.1493	8.535E-03	.1737	2.396E-03
LS A314(100)	10.81	9.32	5.732E-03	.1167	7.336E-03	.1493	8.535E-03	.1737	2.396E-03
US A311(100)	10.84	9.35	5.724E-03	.1165	7.326E-03	.1491	8.524E-03	.1735	2.392E-03
T A304(100)	11.89	10.40	5.427E-03	.1105	6.946E-03	.1414	8.082E-03	.1645	2.268E-03
M A084(100)	11.89	10.40	5.427E-03	.1105	6.946E-03	.1414	8.082E-03	.1645	2.268E-03
LS A315(100)	11.89	10.40	5.427E-03	.1105	6.946E-03	.1414	8.082E-03	.1645	2.268E-03
US A312(100)	11.91	10.42	5.421E-03	.1103	6.937E-03	.1412	8.072E-03	.1643	2.265E-03
M A085(100)	12.54	11.45	5.172E-03	.1053	6.619E-03	.1366	7.702E-03	.1568	2.162E-03
LS A313(100)	12.56	11.48	5.166E-03	.1052	6.612E-03	.1366	7.693E-03	.1566	2.160E-03
US A314(100)	12.56	11.48	5.166E-03	.1052	6.612E-03	.1366	7.693E-03	.1566	2.160E-03
T A304(100)	14.02	12.53	4.945E-03	.1007	6.328E-03	.1288	7.364E-03	.1499	2.067E-03
M A086(100)	14.02	12.53	4.945E-03	.1007	6.328E-03	.1288	7.364E-03	.1499	2.067E-03
LS A315(100)	14.02	12.55	4.940E-03	.1005	6.322E-03	.1287	7.356E-03	.1497	2.064E-03
US A316(100)	14.02	12.55	4.940E-03	.1005	6.322E-03	.1287	7.356E-03	.1497	2.064E-03

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6/29/73

NASA-RI ORBITER HEATING

VA289

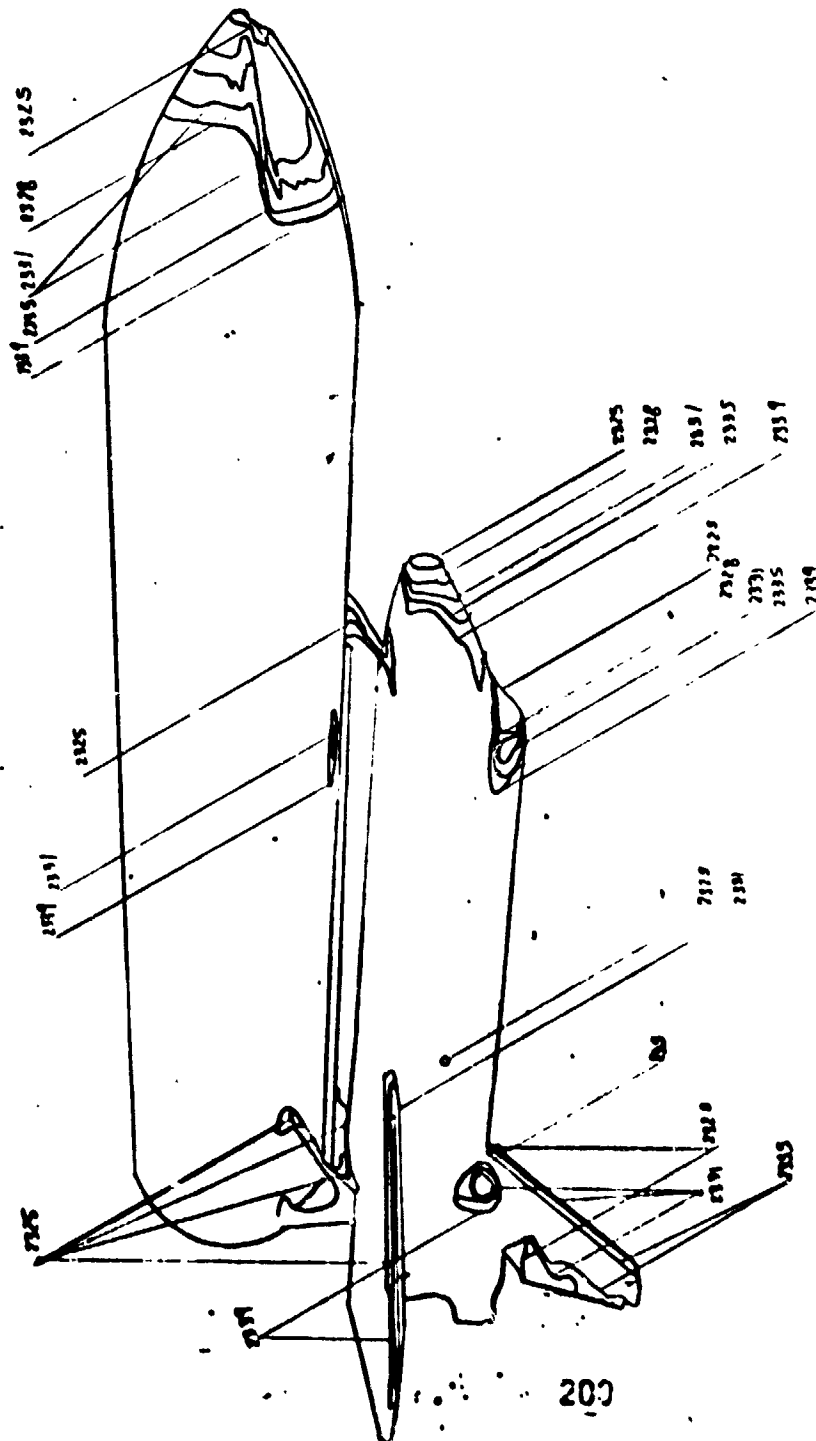
AEDC(ARL-INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL A

GROUP	CONFIG	MODEL	TANK	MACH NO	POI(PSIA)	TO(DEG R)	ALPHA-MODEL	ALPHA-SECTOR	ALPHA-PREBEND	ROLL-MODEL	YAW
25	A			8.00	863.4	1338	0	0	0	180.00	0
T-TAF	P-INF	Q-INF	V-INF				RE/FT	MREF		STREF	
(DEG R)	(PSIA)	(PSIA)	(FT/SFC)			(LB-SEC/FT2)	(FT-1)	(R= .0175FT)		(H= .0175FT)	
97.0	.088	3.962	3861		7.450E-05	7.809E-08	3.782E 06	4.913E-02		2.090E-02	
CAMERA	ROLL NO	PAINT TEMP (DEG F)	INITIAL TEMP (DEG F)	SQUARE ROOT (RHOXCKX)	TBAR(10)	BETA(10)					
TOP(1)	7855										
UPPER SIDE(US)	8049	300	75	.0544	2.801E-01	3.2172E-01					
LOWER SIDE(LS)	7637										
BOTTOM(B)	7267										

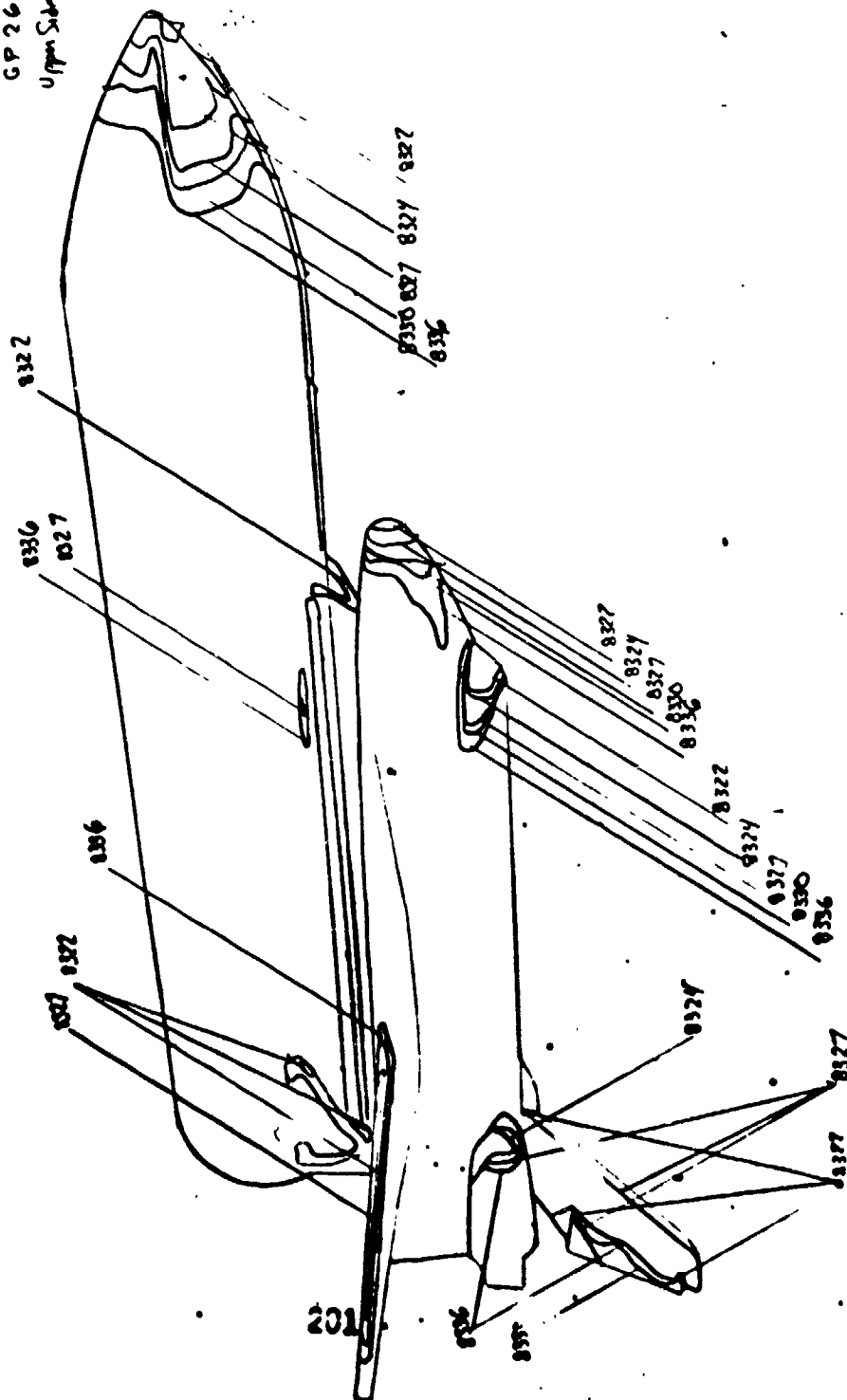
PIC NO	TIME DELTIME	H(10)	H(10)/HREF	H(.970)	H(.970)/HREF	H(.850)	H(.850)/HREF	ST(10)
T 4307(100)	15.09	4.745E-03	.0966	6.073E-03	.1236	7.066E-03	.1438	1.983E-03
R 4007(100)	15.09	4.745E-03	.0966	6.073E-03	.1236	7.066E-03	.1438	1.983E-03
LS 2318(100)	15.09	4.745E-03	.0966	6.073E-03	.1236	7.066E-03	.1438	1.983E-03
US 4315(100)	15.12	4.741E-03	.0965	5.846E-03	.1235	7.066E-03	.1437	1.981E-03
T 4308(100)	16.17	4.548E-03	.0930	5.846E-03	.1190	6.802E-03	.1385	1.909E-03
US 4316(100)	16.17	4.548E-03	.0930	5.846E-03	.1190	6.802E-03	.1385	1.909E-03
R 4008(100)	16.17	4.548E-03	.0930	5.846E-03	.1190	6.802E-03	.1385	1.909E-03
LS 2319(100)	16.17	4.548E-03	.0930	5.846E-03	.1190	6.802E-03	.1385	1.909E-03
T 4309(100)	17.22	4.413E-03	.0894	5.647E-03	.1150	6.571E-03	.1338	1.845E-03
R 4009(100)	17.22	4.413E-03	.0894	5.647E-03	.1150	6.571E-03	.1338	1.845E-03
US 4317(100)	17.24	4.409E-03	.0897	5.643E-03	.1149	6.566E-03	.1336	1.843E-03
LS 2320(100)	17.24	4.409E-03	.0897	5.643E-03	.1149	6.566E-03	.1336	1.843E-03
T 4310(100)	18.30	4.269E-03	.0869	5.444E-03	.1112	6.357E-03	.1294	1.784E-03
US 4090(100)	18.30	4.269E-03	.0869	5.444E-03	.1112	6.357E-03	.1294	1.784E-03
LS 2321(100)	18.30	4.269E-03	.0869	5.444E-03	.1112	6.357E-03	.1294	1.784E-03
US 4314(100)	18.32	4.266E-03	.0868	5.439E-03	.1111	6.352E-03	.1293	1.783E-03
MODEL HAS LEFT CENTERLINE								
T 4311(100)	19.37	4.139E-03	.0842	5.297E-03	.1078	6.163E-03	.1255	1.730E-03
R 4091(100)	19.37	4.139E-03	.0842	5.297E-03	.1078	6.163E-03	.1255	1.730E-03
LS 2322(100)	19.37	4.139E-03	.0842	5.297E-03	.1078	6.163E-03	.1255	1.730E-03
US 4319(100)	19.40	4.136E-03	.0842	5.293E-03	.1077	6.159E-03	.1254	1.729E-03

123

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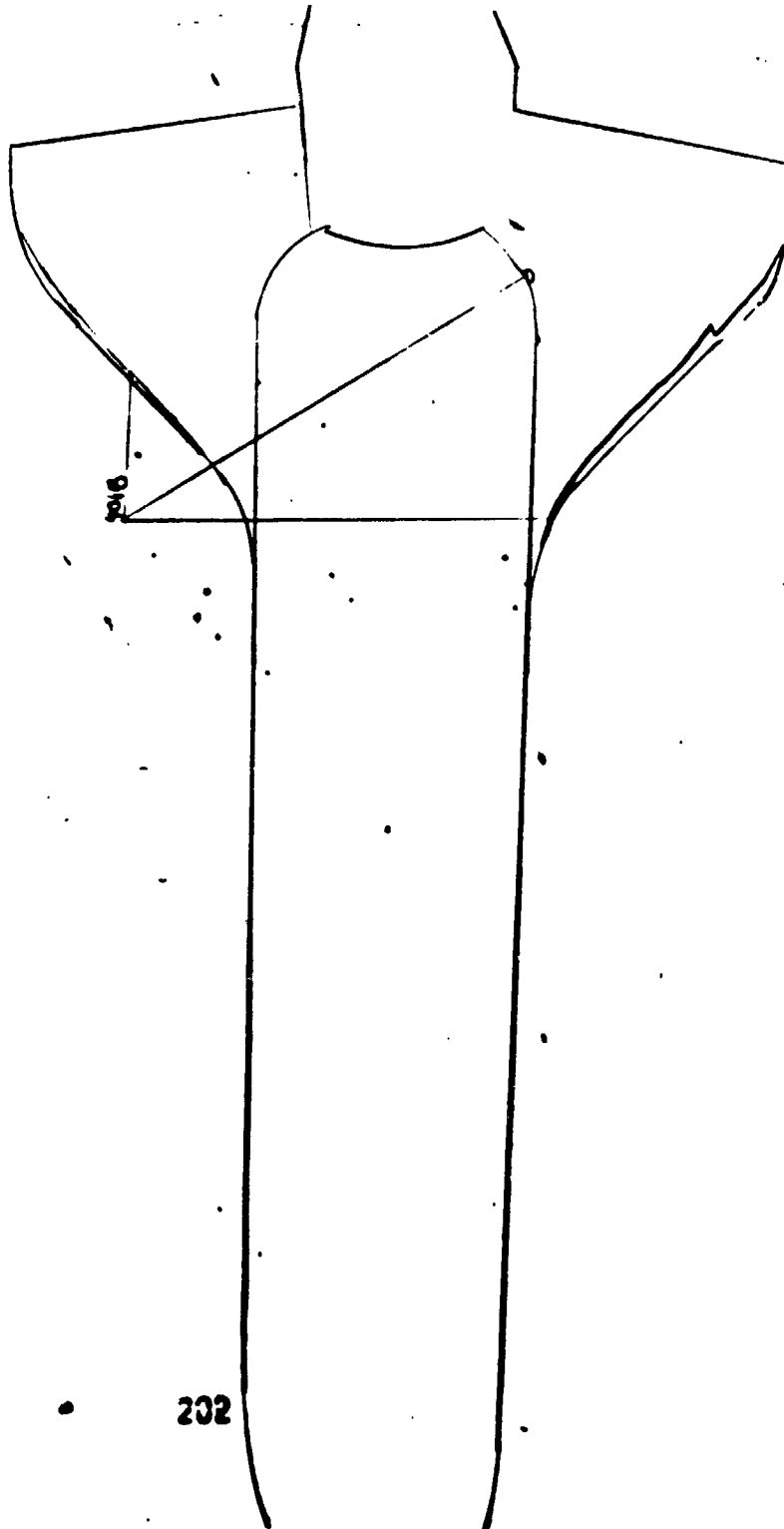


8049  
GP 26  
Upper Side



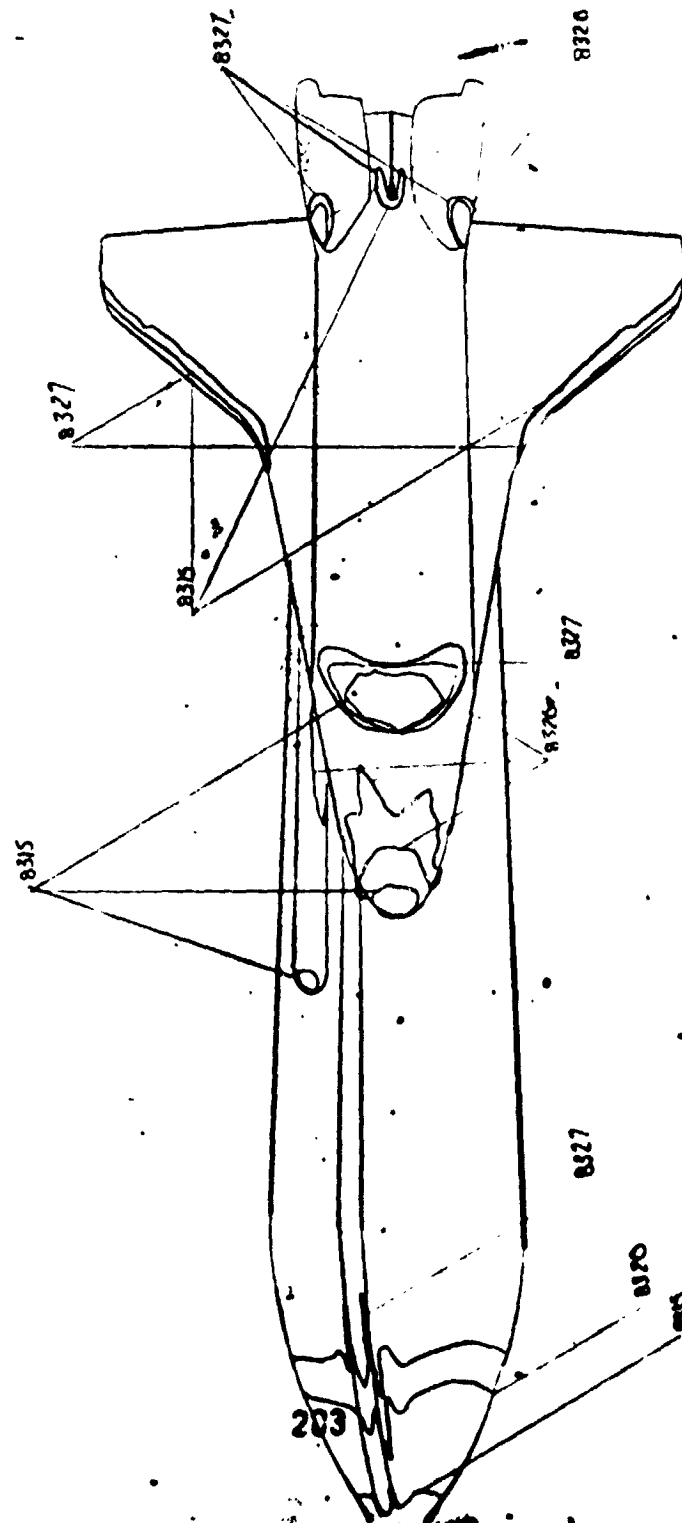
505

Comp 26  
Bo. Name  
7267  
not



202

Comp 26  
Top  
7865  
107





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6/29/73

WEDCIARO-IAC-1 ARNOLD AFS, TENNESSEE  
 VON KAPLAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL 8

NASA-RI WRIGHT PEARCE

VA289

GROUP CAMP16 MODEL MACH NO PROPSIAL T(IDEG R) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREBEND ROLL-MODEL YAW  
 26 1 8.00 862.4 1358 --.15 --.15 0 0 0  
 T-TAF P-IMP Q-IMP V-IMP MU-IMP RE/FT MREF STREF  
 (DEG R) (PSIA) (PSIA) (FT/SEC) (SLUGS/FT<sup>3</sup>) (LBS-SEC/FT<sup>2</sup>) (FT-1) (R= .0175FT) (R= .0175FT)  
 98.4 .008 3.957 386 7.529E-05 7.925E-08 3.695E 06 4.923E-02 2.110E-02  
 CAMERA ROLL NO PAINT TEMP G F INITIAL TEMP (DEG F) SQUARE ROOT (RMSCXK) TBAR(TO) BETA(TO)  
 7855 78 0.0550 0 0  
 UPPER SINE(US) 8649 350  
 LOWER SINE(LS) 7637  
 BOTTOM(M)

PIC NO TIME DELTIME M(TO) M(TO)/MREF M(.910) M(.910)/MREF M(.85TO) M(.85TO)/MREF ST(TO)  
 T 0312(150) 1-15 1-650E-02 3351 7-140E-02 .4362 2-533E-02 .5145 6-924E-03  
 M 0312(150) 1-15 1-650E-02 3351 2-140E-02 .4362 2-533E-02 .5145 6-924E-03  
 LS 0323(150) 1-15 1-650E-02 3351 2-140E-02 .4362 2-533E-02 .5145 6-924E-03  
 US 0323(150) 1-15 1-650E-02 3351 2-140E-02 .4362 2-533E-02 .5145 6-924E-03  
 T 0313(150) 2-23 1-313E-02 2667 1-702E-02 .3473 2-016E-02 .4095 5-514E-03  
 M 0313(150) 2-23 1-313E-02 2667 1-702E-02 .3473 2-016E-02 .4095 5-514E-03  
 LS 0324(150) 2-23 1-313E-02 2667 1-702E-02 .3473 2-016E-02 .4095 5-514E-03  
 US 0324(150) 2-23 1-313E-02 2667 1-702E-02 .3473 2-016E-02 .4095 5-514E-03  
 T 0314(150) 3-20 1-650E-02 3351 7-140E-02 .4362 2-533E-02 .5145 6-924E-03  
 M 0314(150) 3-20 1-650E-02 3351 2-140E-02 .4362 2-533E-02 .5145 6-924E-03  
 LS 0325(150) 3-20 1-650E-02 3351 2-140E-02 .4362 2-533E-02 .5145 6-924E-03  
 US 0325(150) 3-20 1-650E-02 3351 2-140E-02 .4362 2-533E-02 .5145 6-924E-03  
 T 0315(150) 4-26 2-07 1-313E-02 2667 1-702E-02 .3473 2-016E-02 .4095 5-514E-03  
 M 0315(150) 4-26 2-07 1-313E-02 2667 1-702E-02 .3473 2-016E-02 .4095 5-514E-03  
 LS 0326(150) 4-26 2-07 1-313E-02 2667 1-702E-02 .3473 2-016E-02 .4095 5-514E-03  
 US 0326(150) 4-26 2-07 1-313E-02 2667 1-702E-02 .3473 2-016E-02 .4095 5-514E-03  
 T 0316(150) 5-43 3-04 1-119E-02 2273 1-457E-02 .2940 1-719E-02 .3491 4-698E-03  
 M 0316(150) 5-43 3-04 1-119E-02 2273 1-457E-02 .2940 1-719E-02 .3491 4-698E-03  
 LS 0327(150) 5-43 3-04 1-119E-02 2273 1-457E-02 .2940 1-719E-02 .3491 4-698E-03  
 US 0327(150) 5-43 3-04 1-119E-02 2273 1-457E-02 .2940 1-719E-02 .3491 4-698E-03  
 T 0317(150) 6-51 5-07 9-921E-03 2016 1-292E-02 .2624 1-523E-02 .3095 4-166E-03  
 M 0317(150) 6-51 5-07 9-921E-03 2016 1-292E-02 .2624 1-523E-02 .3095 4-166E-03  
 LS 0328(150) 6-51 5-07 9-921E-03 2016 1-292E-02 .2624 1-523E-02 .3095 4-166E-03  
 US 0328(150) 6-51 5-07 9-921E-03 2016 1-292E-02 .2624 1-523E-02 .3095 4-166E-03  
 T 0318(150) 7-56 6-07 9-921E-03 1832 1-174E-02 .2385 1-385E-02 .2813 3-786E-03  
 M 0318(150) 7-56 6-07 9-921E-03 1832 1-174E-02 .2385 1-385E-02 .2813 3-786E-03

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6/29/73

NASA-RI ORBITER HEATING

VA280

AEDC(ARNO-INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL N

GROUP CONFIG MODEL MACH NO POI(PSIA) TO(DEG R) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREBEND ROLL-MODEL YAW

2A 1 1 8.00 802.8 1358 -0.15 -0.15 0 0 0

T-Inf P-Inf Q-Inf V-Inf MU-Inf RW-Inf STR F

IDEG R (PCIA) (PSIA) (FT/SEC) (SLUGS/FT3) (LR-SEC/FT2) (FT-1) (R-0175FT) (R-0175FT)

98.0 0.00 3.059 3004 7.435E-05 7.922E-06 3.699E 06 4.924E-02 2.109E-02

CAMERA ROLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RMORCK) TBAR(10) BETA(10)

TOP(1) 7855 78 0.950 3.310E-01 4.0660E-01

UPPER SIDE(US) 8049

LOWER SIDE(LS) 7637

MOTOM(0) 7267

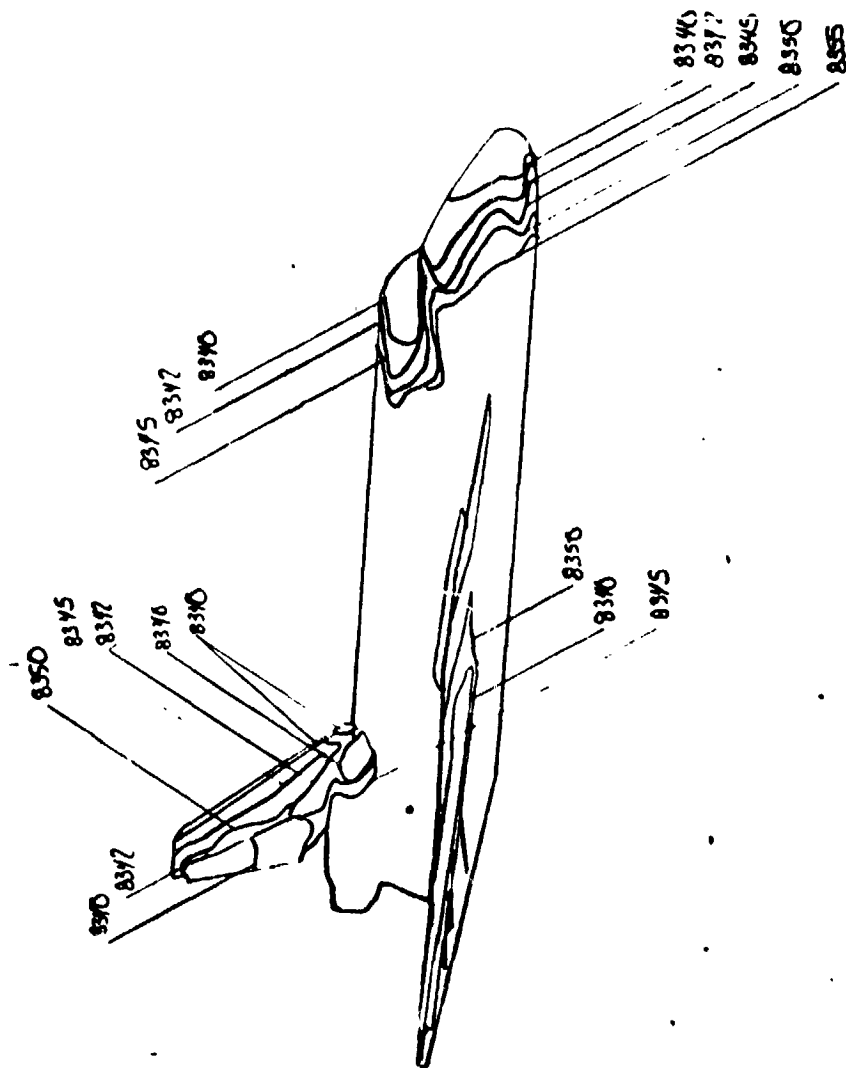
205

PIC NO	TIME	DELTIME	M1(0)	M1(0)/MREF	M1(010)	M1(010)/MREF	M1(0510)	M1(0510)/MREF	ST(10)
US 0326(150)	7.58	0.00	9.002E-03	0.028	1.170E-02	0.028	1.302E-02	0.027	1.790E-03
LS 0329(150)	7.58	0.00	9.002E-03	0.028	1.170E-02	0.028	1.302E-02	0.027	1.790E-03
T 0310(150)	0.63	7.15	0.314E-03	0.009	1.192E-02	0.009	1.277E-02	0.009	3.490E-03
US 0306(150)	0.63	7.15	0.314E-03	0.009	1.192E-02	0.009	1.277E-02	0.009	3.490E-03
LS 0330(150)	0.63	7.15	0.314E-03	0.009	1.192E-02	0.009	1.277E-02	0.009	3.490E-03
US 0327(150)	0.66	7.17	0.249E-03	0.006	1.000E-02	0.006	1.274E-02	0.006	3.490E-03
M 0319(150)	0.60	0.28	7.762E-03	0.176	1.011E-02	0.042	1.192E-02	0.040	3.490E-03
T 0311(150)	0.71	0.22	7.750E-03	0.174	1.000E-02	0.049	1.190E-02	0.047	3.253E-03
LS 0331(150)	0.71	0.22	7.750E-03	0.174	1.000E-02	0.049	1.190E-02	0.047	3.253E-03
T 0321(150)	10.76	0.27	7.240E-03	0.182	0.501E-03	0.190	1.121E-02	0.216	3.063E-03
LS 0332(150)	10.76	0.27	7.240E-03	0.182	0.501E-03	0.190	1.121E-02	0.216	3.063E-03
US 0324(150)	10.79	0.34	7.240E-03	0.180	0.490E-03	0.197	1.119E-02	0.223	3.063E-03
T 0322(150)	11.04	10.35	0.900E-03	0.103	0.994E-03	0.107	1.061E-02	0.2154	2.900E-03
LS 0333(150)	11.04	10.35	0.900E-03	0.103	0.994E-03	0.107	1.061E-02	0.2154	2.900E-03
US 0330(150)	11.04	10.37	0.900E-03	0.102	0.983E-03	0.105	1.059E-02	0.2152	2.896E-03
T 0323(150)	12.51	11.03	0.575E-03	0.134	0.500E-03	0.170	1.010E-02	0.2050	2.759E-03
LS 0334(150)	12.51	11.03	0.575E-03	0.133	0.500E-03	0.170	1.010E-02	0.2050	2.759E-03
US 0331(150)	12.54	11.04	0.575E-03	0.134	0.500E-03	0.170	1.010E-02	0.2050	2.759E-03
M 0304(150)	13.57	12.08	0.242E-03	0.124	0.191E-03	0.164	0.660E-03	0.162	2.640E-03
T 0326(150)	13.59	12.56	0.242E-03	0.127	0.193E-03	0.162	0.651E-03	0.160	2.630E-03
LS 0335(150)	13.59	12.56	0.242E-03	0.127	0.193E-03	0.162	0.651E-03	0.160	2.630E-03
US 0336(150)	13.59	12.56	0.242E-03	0.127	0.193E-03	0.162	0.651E-03	0.160	2.630E-03

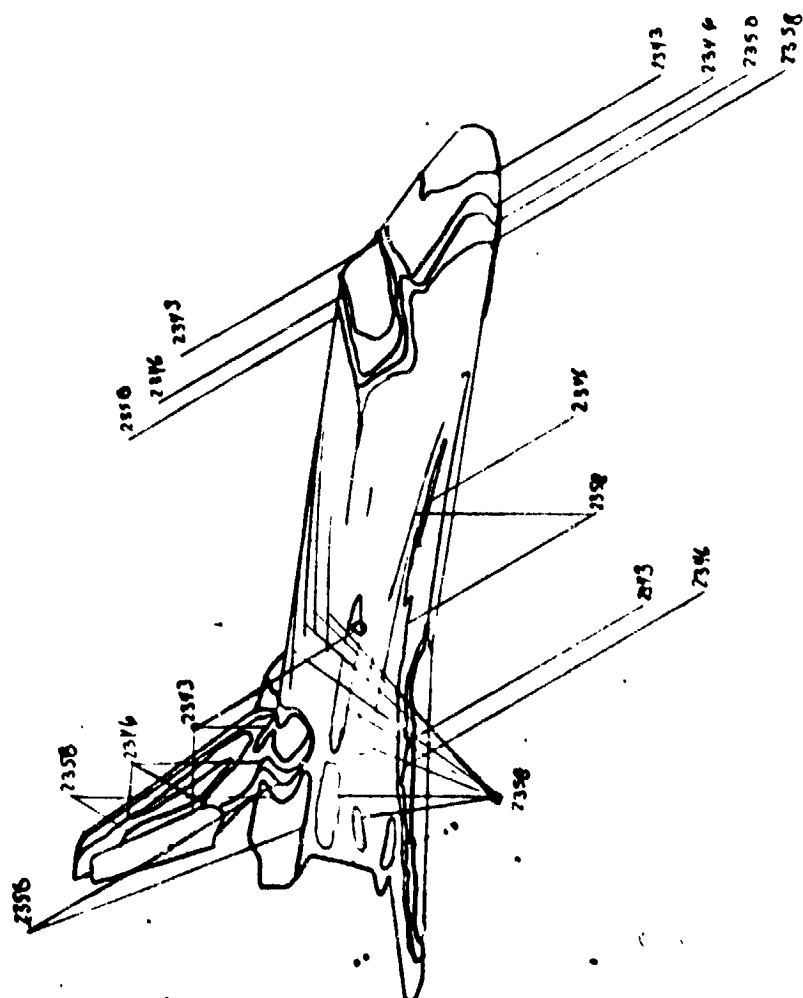
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8049  
CP 27  
Up 141  
Sdr

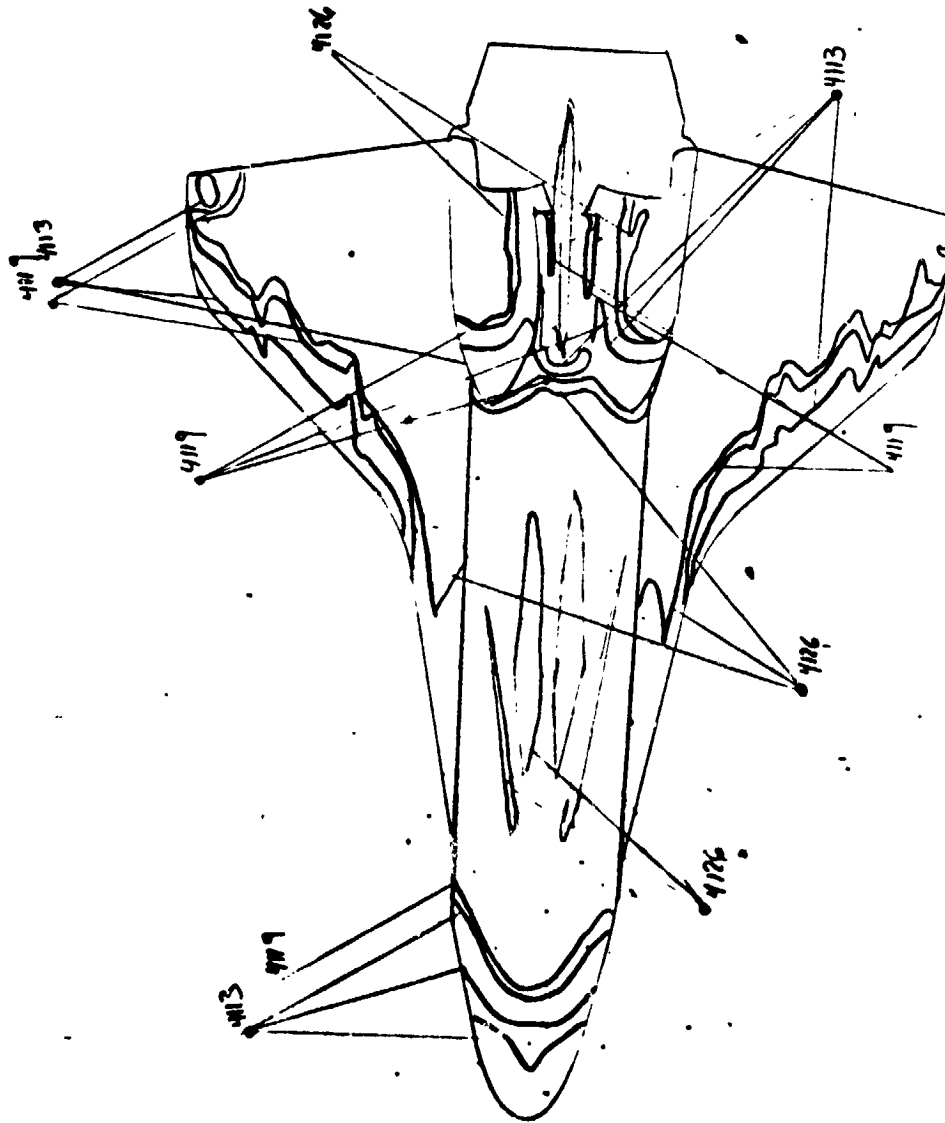


7687  
CF 27  
Lower Side

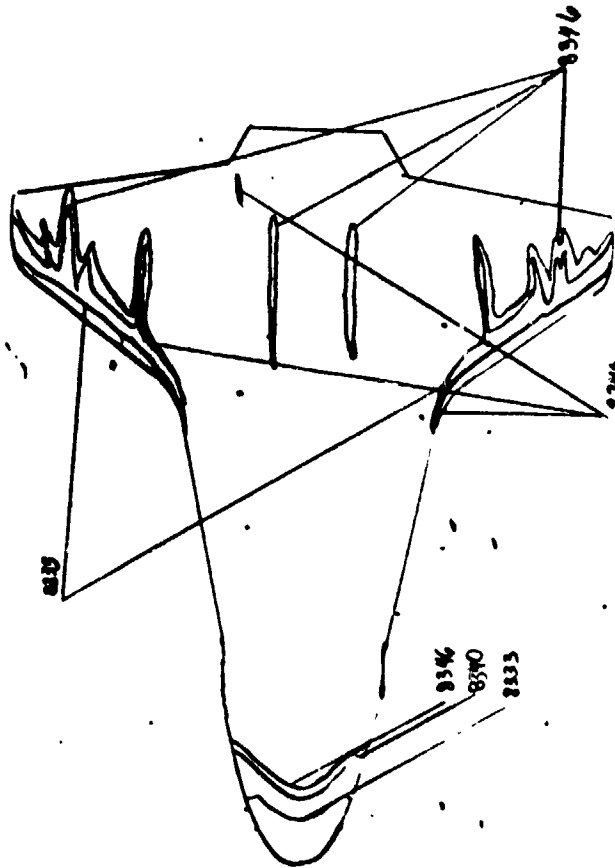


208

Group 27  
7267  
Bottom  
W



Group 27  
Top  
7855  
new



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 6/29/73

NASA-BI ORBITER PEATING  
 VA289  
 AEDC(ARO, INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL R

BROUJ CMFTG MODEL MACH NO PO(PSIA) TO(EG R) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREBEND ROLL-MODEL YAW  
 27 2 ORBITER S 8.00 859.3 1345 -4.86 4.86 0 180.00 -0.00  
 T-INF P-INF Q-INF V-INF RHO-INF MU-INF RE/FT MREF STREF  
 (PSIA) (PSIA) (FT/SEC) (SLUGS/FT3) (LR-SEC/FT2) (FT-1) (R= .0175FT) (R= .0175FT)  
 97.4 .088 3.943 3869 7.579E-05 7.844E-08 3.739E 06 4.905E-02 2.101E-02  
 CAMERA ROLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHOXCK) TBAR(TO) BETA(TO)  
 TOP(T) 7555  
 UPPER SIDE(US) 8049  
 LOWER SIDE(LS) 7637  
 BOTTOM(B) 7267

PIC NO TIME DELTIME H(TO)/MREF H(.9TO)/MREF H(.85TO) H(.85TO)/MREF ST(TO)  
 H 4110(200) 1.13 MODEL HAS NOT REACHED CENTERLINE H(.9TO) M(.85TO) H(.85TO)/MREF ST(TO)  
 T 4330(200) 1.15 MODEL HAS NOT REACHED CENTERLINE  
 US 4338(200) 1.15 MODEL HAS NOT REACHED CENTERLINE  
 LS 2341(200) 1.15 MODEL HAS NOT REACHED CENTERLINE  
 T 4331(200) 2.23 MODEL HAS NOT REACHED CENTERLINE  
 US 4339(200) 2.23 MODEL HAS NOT REACHED CENTERLINE  
 H 4111(200) 2.23 MODEL HAS NOT REACHED CENTERLINE  
 LS 2342(200) 2.23 MODEL HAS NOT REACHED CENTERLINE  
 INJECT TIME 2.65  
 T 4332(200) 3.30 1.81 5.923E-03 .1207 7.314E-03 .1491 8.289E-03 .1690 2.505E-03  
 US 4340(200) 3.30 1.81 5.923E-03 .1207 7.314E-03 .1491 8.289E-03 .1690 2.505E-03  
 H 4112(200) 3.30 1.81 5.923E-03 .1207 7.314E-03 .1491 8.289E-03 .1690 2.505E-03  
 LS 2343(200) 3.30 1.81 5.923E-03 .1207 7.314E-03 .1491 8.289E-03 .1690 2.505E-03  
 T 4333(200) 4.36 2.87 4.713E-03 .0960 5.320E-03 .1186 6.595E-03 .1344 1.992E-03  
 US 4332(200) 4.36 2.87 4.713E-03 .0956 5.320E-03 .1181 6.595E-03 .1338 1.984E-03  
 H 4113(200) 4.36 2.87 4.713E-03 .0956 5.320E-03 .1181 6.595E-03 .1338 1.984E-03  
 LS 2344(200) 4.36 2.87 4.713E-03 .0956 5.320E-03 .1181 6.595E-03 .1338 1.984E-03  
 T 4334(200) 5.43 3.94 4.018E-03 .0819 4.962E-03 .1011 5.623E-03 .1146 1.699E-03  
 US 4341(200) 5.43 3.94 4.018E-03 .0819 4.962E-03 .1011 5.623E-03 .1146 1.699E-03  
 H 4114(200) 5.43 3.94 4.018E-03 .0819 4.962E-03 .1011 5.623E-03 .1146 1.699E-03  
 LS 2345(200) 5.43 3.94 4.018E-03 .0819 4.962E-03 .1011 5.623E-03 .1146 1.699E-03  
 T 4335(200) 6.51 5.02 3.562E-03 .0724 4.394E-03 .0966 4.984E-03 .1016 1.505E-03  
 US 4342(200) 6.51 5.02 3.562E-03 .0724 4.394E-03 .0966 4.984E-03 .1016 1.505E-03  
 H 4115(200) 6.51 5.02 3.562E-03 .0724 4.394E-03 .0966 4.984E-03 .1016 1.505E-03  
 LS 2346(200) 6.51 5.02 3.562E-03 .0724 4.394E-03 .0966 4.984E-03 .1016 1.505E-03  
 T 4336(200) 7.50 6.09 3.232E-03 .0659 3.991E-03 .0914 4.523E-03 .0922 1.367E-03  
 US 4343(200) 7.50 6.09 3.232E-03 .0659 3.991E-03 .0914 4.523E-03 .0922 1.367E-03  
 H 4116(200) 7.50 6.09 3.232E-03 .0659 3.991E-03 .0914 4.523E-03 .0922 1.367E-03  
 LS 2347(200) 7.50 6.09 3.232E-03 .0659 3.991E-03 .0914 4.523E-03 .0922 1.367E-03

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6/29/73

# NASA-RI ORBITER HEATING

VA289

AED(ARO-INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL R

GROUP CONFIG MODEL MACH NO PO(P(SIA) TO( DEG R) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREEND ROLL-MODEL YAW  
 27 2 ORBITER S 8.00 859.3 1344 -4.36 4.86 0 180.00 -.00

T-INF P-INF Q-INF V-INF MU-INF RHO-INF RE/FT HREF STREF  
 (DEG R) (PSIA) (PSIA) (FT/SEC) (SLUGS/FT3) (LB-SEC/FT2) (FT-1) (R=.0175FT) (R=.0175FT)  
 97.4 .088 3.943 .3869 7.540E-05 7.243E-08 3.739E 06 4.905E-02 2.101E-02

CAMERA ROLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHOCXK) TRAR(ITO) BETAI(TO)

TOP(IT) 7855  
 UPPER SIDE(US) 8049  
 LOWER SIDE(LS) 7637  
 BOTTOM(B) 7267

.0519 1.523E-01 1.5372E-01

PIC NO	TIME DELTIME	H(ITO)	H(ITO)/HREF	HL(910)	HL(970)/HREF	HL(8570)	HL(8570)/HREF	ST(ITO)
T 8336(200)	7.61	3.225E-03	.0657	3.983E-03	.0812	4.513E-03	.0920	1.364E-03
US 8344(200)	7.61	3.225E-03	.0657	3.983E-03	.0812	4.513E-03	.0920	1.364E-03
T 8337(200)	8.66	2.979E-03	.0607	3.679E-03	.0750	4.169E-03	.0850	1.260E-03
H 4117(200)	8.66	2.979E-03	.0607	3.679E-03	.0750	4.169E-03	.0850	1.260E-03
LS 2348(200)	8.66	2.979E-03	.0607	3.679E-03	.0750	4.169E-03	.0850	1.260E-03
US 8345(200)	8.68	2.974E-03	.0606	3.673E-03	.0749	4.162E-03	.0848	1.258E-03
T 8338(200)	9.74	2.778E-03	.0566	3.431E-03	.0699	3.888E-03	.0793	1.175E-03
H 4118(200)	9.74	2.778E-03	.0566	3.431E-03	.0699	3.888E-03	.0793	1.175E-03
LS 2349(200)	9.74	2.778E-03	.0566	3.431E-03	.0699	3.888E-03	.0793	1.175E-03
US 8346(200)	9.76	2.774E-03	.0565	3.426E-03	.0698	3.882E-03	.0791	1.173E-03
T 8339(200)	10.79	2.616E-03	.0533	3.231E-03	.0659	3.661E-03	.0746	1.106E-03
H 4119(200)	10.79	2.616E-03	.0533	3.231E-03	.0659	3.661E-03	.0746	1.106E-03
LS 2350(200)	10.81	2.613E-03	.0533	3.227E-03	.0658	3.657E-03	.0745	1.105E-03
US 8347(200)	10.81	2.613E-03	.0533	3.227E-03	.0658	3.657E-03	.0745	1.105E-03
T 8340(200)	11.86	2.477E-03	.0505	3.059E-03	.0624	3.466E-03	.0707	1.048E-03
H 4120(200)	11.86	2.477E-03	.0505	3.059E-03	.0624	3.466E-03	.0707	1.048E-03
LS 2351(200)	11.86	2.477E-03	.0505	3.059E-03	.0624	3.466E-03	.0707	1.048E-03
US 8348(200)	11.89	2.474E-03	.0504	3.055E-03	.0623	3.462E-03	.0706	1.047E-03
T 8341(200)	12.54	2.349E-03	.0481	2.912E-03	.0594	3.299E-03	.0673	9.970E-04
H 4121(200)	12.54	2.349E-03	.0481	2.912E-03	.0594	3.299E-03	.0673	9.970E-04
LS 2352(200)	12.54	2.349E-03	.0481	2.912E-03	.0594	3.299E-03	.0673	9.970E-04
US 8349(200)	12.56	2.355E-03	.0480	2.908E-03	.0593	3.295E-03	.0672	9.959E-04
T 8342(200)	14.02	2.254E-03	.0459	2.784E-03	.0567	3.155E-03	.0643	9.529E-04
H 4122(200)	14.02	2.254E-03	.0459	2.784E-03	.0567	3.155E-03	.0643	9.529E-04
LS 2353(200)	14.02	2.254E-03	.0459	2.784E-03	.0567	3.155E-03	.0643	9.529E-04

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6/29/73

NASA-RI ORBITER HEATING  
 VA299  
 AEDC(ARO-INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL R

GROUP	CONFIG	MODEL	MACH NO	PO(PSTIA)	TO(DEG R)	ALPHA-MODEL	ALPHA-SECTOR	ALPHA-PREBEND	ROLL-MODEL	YAW
27	2	ORBITER S	8.00	859.7	1344	-4.86	4.86	0	180.00	-0.00
T-INF	P-INF	Q-INF	V-INF	RHO-INF	MU-INF	RE/FT	HREF	STREF		
(DEG R)	(PSTIA)	(PSTIA)	(FT/SEC)	(SLUGS/FT <sup>3</sup> )	(LB-SEC/FT <sup>2</sup> )	(FT-1)	(R <sub>0</sub> .0175FT)	(R <sub>0</sub> .0175FT)		
97.4	.088	3.945	3869	7.594E-05	7.843E-08	3.742E 06	4.906E-02	2.100E-02		
CAMERA	ROLL NO	PAINT TEMP (DEG F)	INITIAL TEMP (DEG F)	SQUARE ROOT (RHOXCK)	TBRAR(TO)	BETA(TO)				
TOP(T)	7855									
UPPER SIDE(US)	8049									
LOWER SIDE(LS)	7637									
BOTTOM(BR)	7267									

PIC NO	TIME DELTIME	H(TO)	H(TO)/HREF	M(.9TO)	M(.9TO)/HREF	M(.85TO)	M(.85TO)/HREF	ST(TO)
US 2350(200)	14.04	2.252E-03	.0459	2.781E-03	.0547	3.151E-03	.0642	9.522E-04
T 2343(200)	15.09	2.163E-03	.0441	2.671E-03	.0545	3.027E-03	.0617	9.148E-04
US 2351(200)	15.09	2.163E-03	.0441	2.671E-03	.0545	3.027E-03	.0617	9.148E-04
M 2351(200)	15.09	2.163E-03	.0441	2.671E-03	.0545	3.027E-03	.0617	9.148E-04
LS 2354(200)	15.09	2.163E-03	.0441	2.671E-03	.0545	3.027E-03	.0617	9.148E-04
T 2344(200)	15.07	2.049E-03	.0426	2.580E-03	.0526	2.924E-03	.0596	8.835E-04
US 2352(200)	16.07	2.049E-03	.0426	2.580E-03	.0526	2.924E-03	.0596	8.835E-04
M 2352(200)	16.07	2.049E-03	.0426	2.580E-03	.0526	2.924E-03	.0596	8.835E-04
LS 2355(200)	16.07	2.049E-03	.0426	2.580E-03	.0526	2.924E-03	.0596	8.835E-04
T 2345(200)	17.12	2.018E-03	.0411	2.492E-03	.0508	2.824E-03	.0576	8.534E-04
M 2345(200)	17.12	2.018E-03	.0411	2.492E-03	.0508	2.824E-03	.0576	8.534E-04
LS 2356(200)	17.12	2.018E-03	.0411	2.492E-03	.0508	2.824E-03	.0576	8.534E-04
US 2353(200)	17.14	2.016E-03	.0411	2.490E-03	.0508	2.822E-03	.0575	8.527E-04
M 2353(200)	17.17	1.953E-03	.0398	2.412E-03	.0492	2.734E-03	.0557	8.269E-04
LS 2357(200)	18.20	1.952E-03	.0398	2.410E-03	.0491	2.732E-03	.0557	8.256E-04
T 2347(200)	18.20	1.952E-03	.0398	2.410E-03	.0491	2.732E-03	.0557	8.256E-04
US 2358(200)	19.25	1.843E-03	.0386	2.338E-03	.0477	2.649E-03	.0540	8.006E-04
M 2358(200)	19.27	1.842E-03	.0386	2.336E-03	.0476	2.648E-03	.0540	8.003E-04
LS 2359(200)	19.27	1.842E-03	.0386	2.336E-03	.0476	2.648E-03	.0540	8.003E-04
MODEL WAS LEFT CENTERLINE								
T 2348(200)	20.32	1.838E-03	.0375	2.270E-03	.0463	2.573E-03	.0525	7.781E-04
M 2348(200)	20.32	1.838E-03	.0375	2.270E-03	.0463	2.573E-03	.0525	7.781E-04
LS 2359(200)	20.32	1.838E-03	.0375	2.270E-03	.0463	2.573E-03	.0525	7.781E-04

129

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6/29/73

## NASA-BI ORBITER HEATING

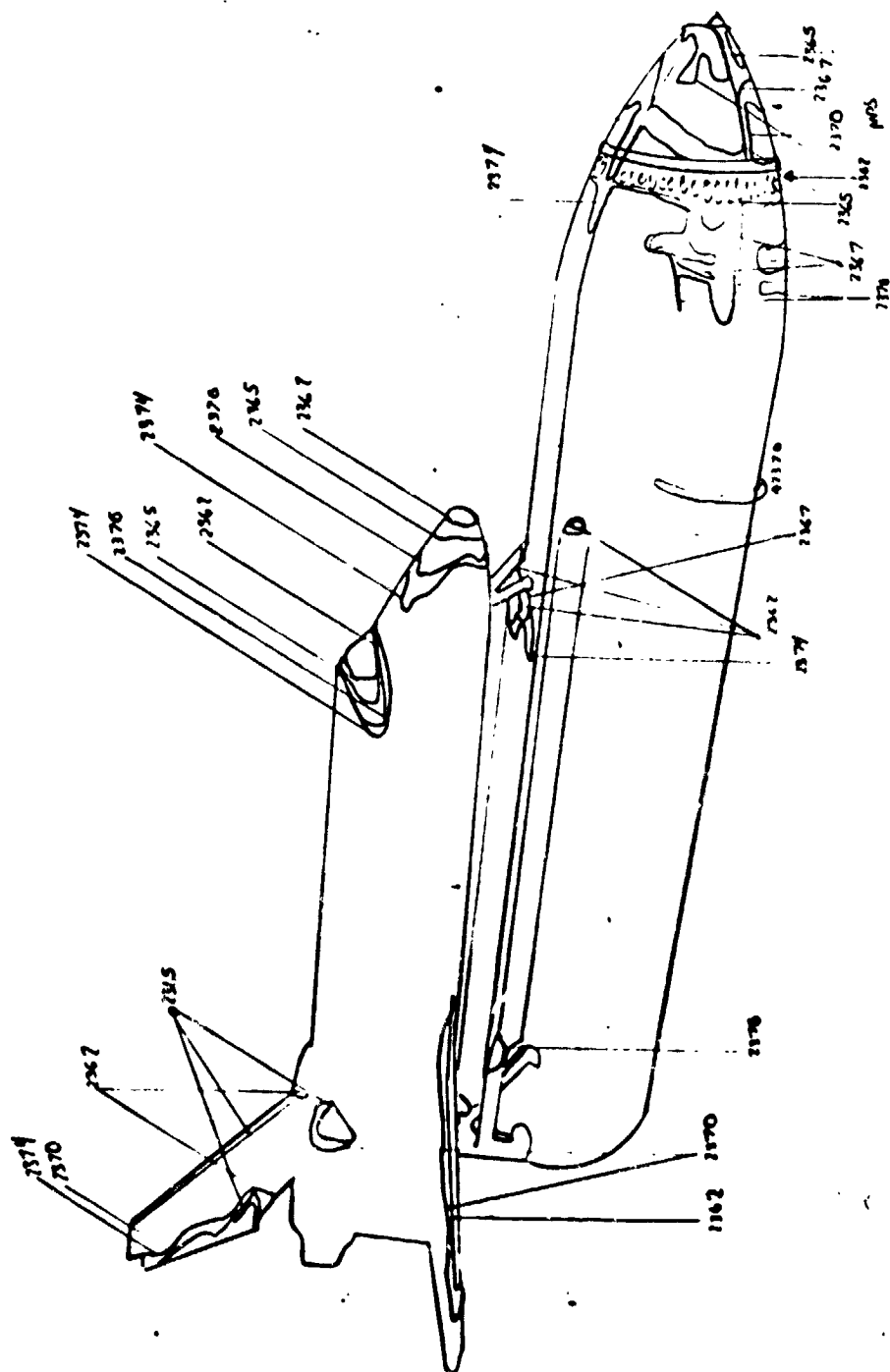
VA289

AEDC(ARO-INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL R

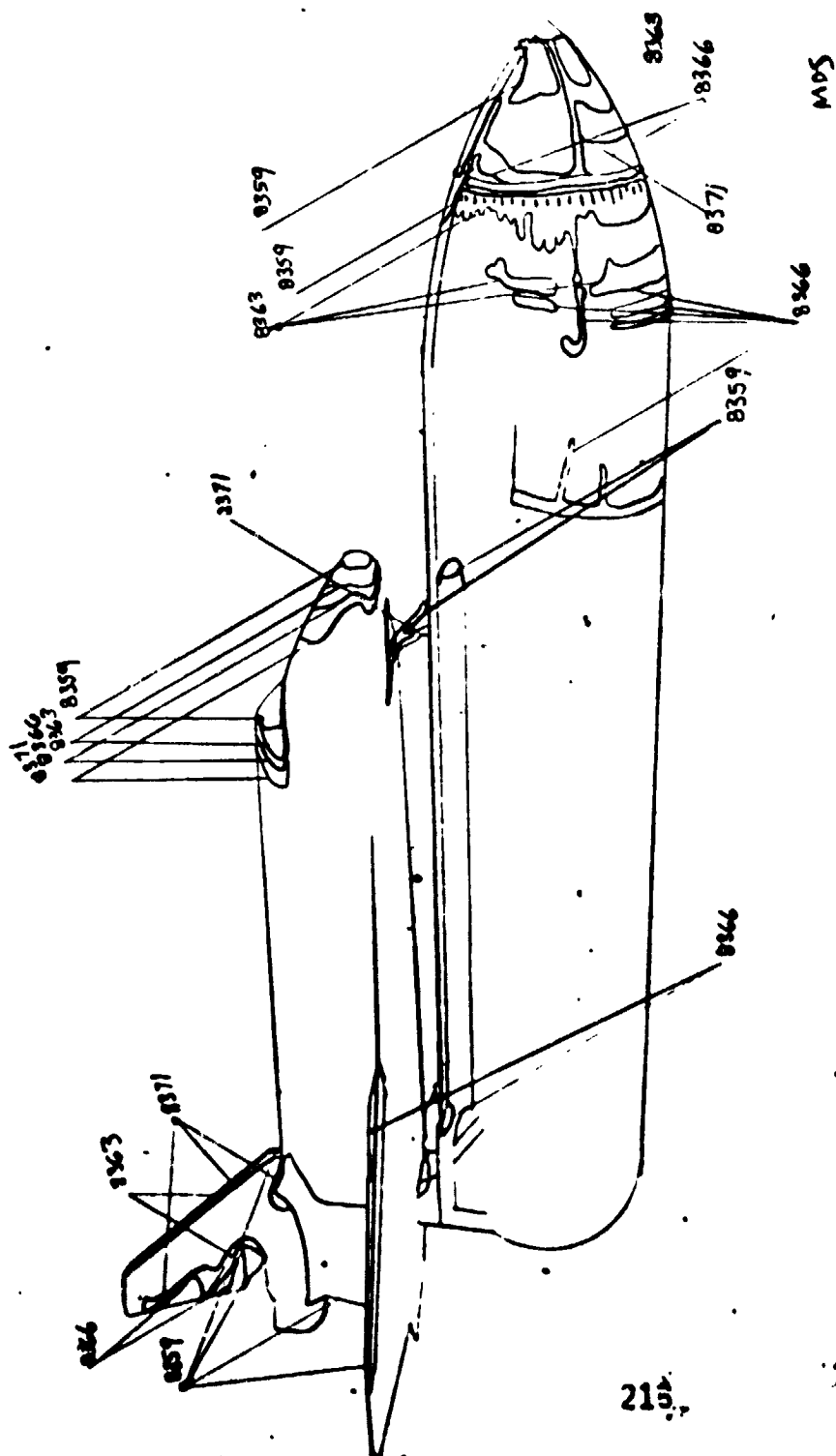
GROUP	CONFIG	MODEL	MACH NO	PR(PISA)	TO(DEC R)	ALPHA-MODEL	ALPHA-SECTOR	ALPHA-PRERNO	ROLL-MODEL	YAW
27	2	ORBITER S	8.00	858.7	1344	-4.86	4.86	0	180.00	-0.00
I-IAF	P-INF	Q-INF	V-INF	RMN-INF	MU-INF	RE/FT	HREF	STREF		
(DEC R)	(PSIA)	(PSIA)	(FT/SEC)	(SLUGS/FT <sup>3</sup> )	(LR-SEC/FT <sup>2</sup> )	(FT-1)	(R <sub>0</sub> .0175FT)	(M <sub>0</sub> .0175FT)		
97.4	.088	3.940	.3869	7.575E-05	7.644E-08	2.736E 06	4.904E-02	2.102E-02		
CAMFRA	POLL NO	PAINT TEMP (DEC F)	INITIAL TEMP (DEC F)	SQUARE ROOT (RHO/CXK)	TRAR(10)	BETA(10)				
TOP(T)	7855	280	77	.0519	1.523E-01	1.5372E-01				
UPPER SINE(HS)	8849									
LOWER SINE(LS)	7637									
MOTTON(R)	7267									

PIC NO	TIME DELTIME	M(10)	M(10)/HREF	M(10)	M(10)/HREF	M(10)	M(10)/HREF	ST(10)
US #356(200)	20.35 18.86	1.037E-03	.0375	2.269E-03	.0463	2.571E-03	.0524	7.777E-04

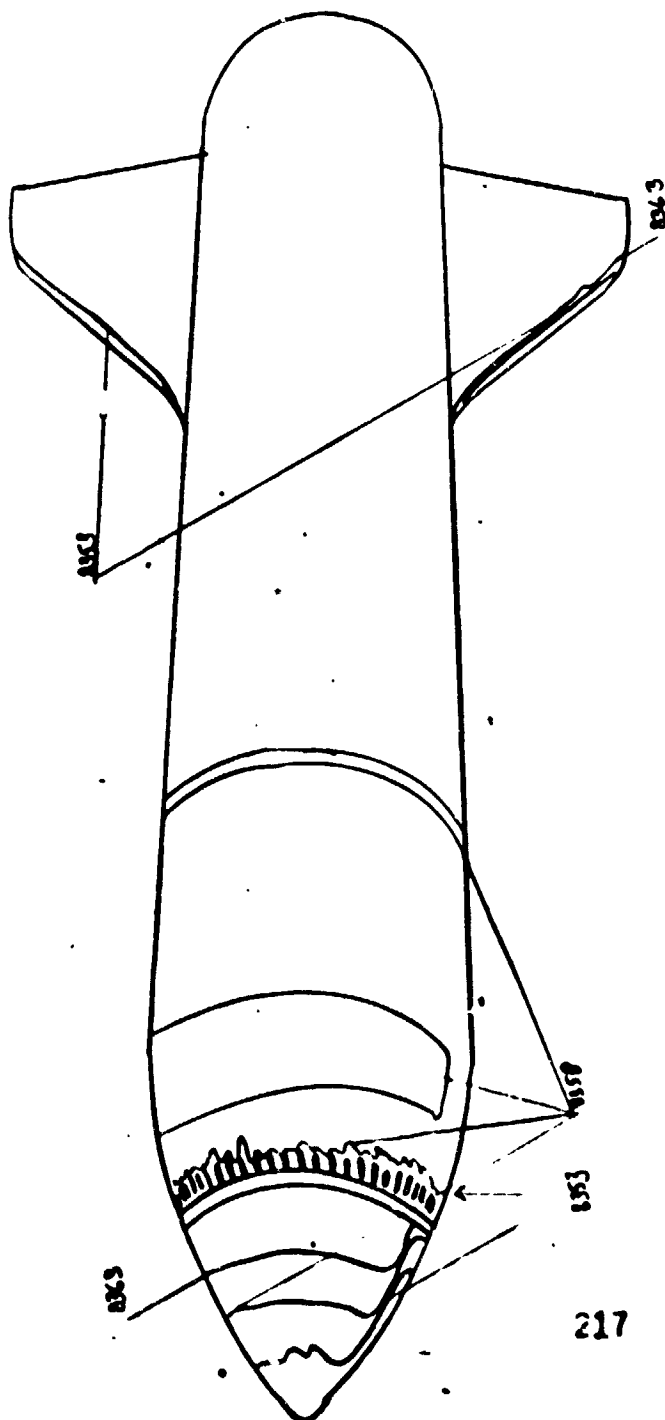
7637  
G R 28  
Lower Side



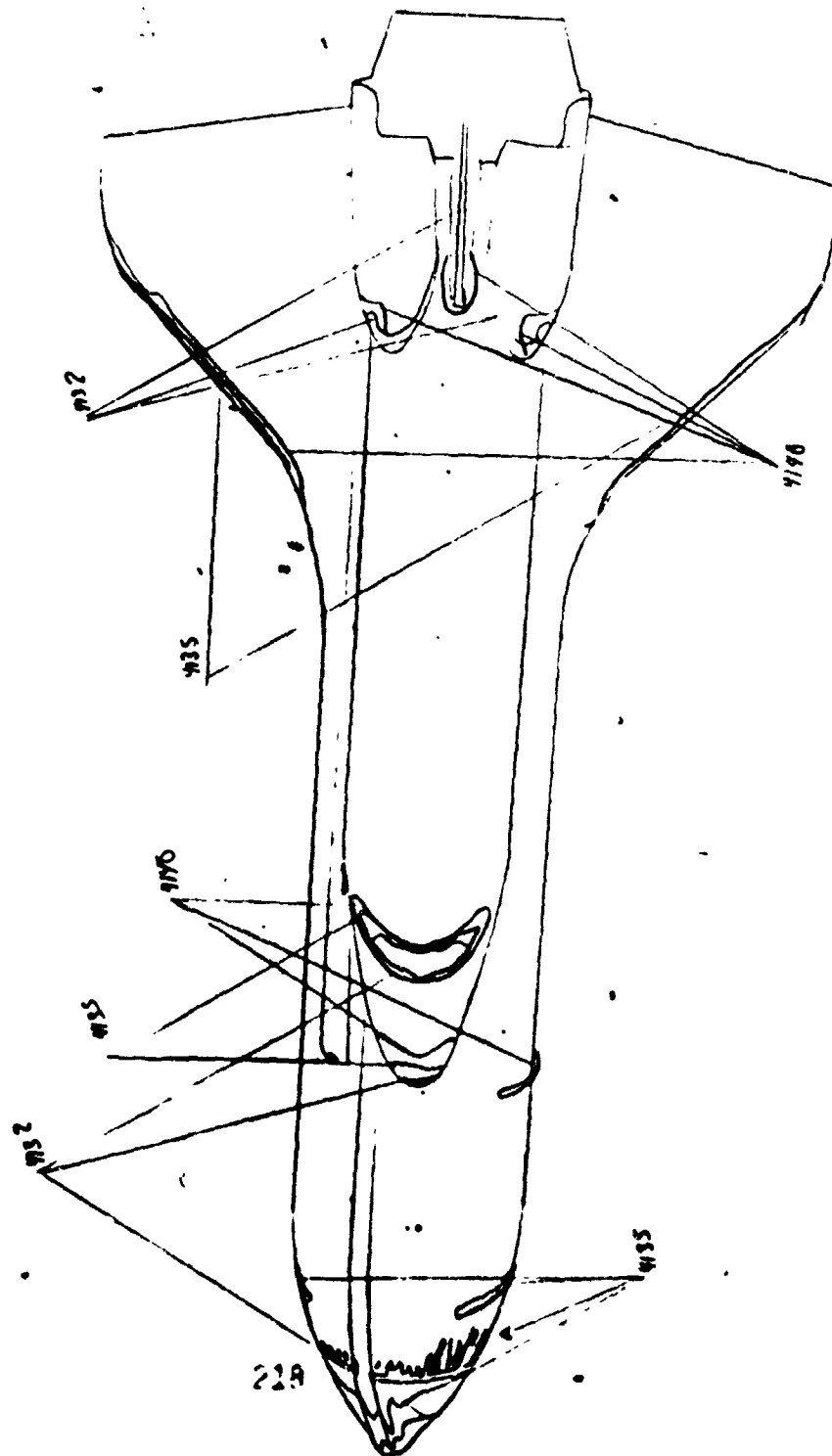
215



Group 28  
Top 7855  
W



Group 28  
B. from  
7267  
ms



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6/29/73

NASA-R1 ORBITER HEATING

AEDCIARD, INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL #

VA209

GROUP	CONFIG	MODEL	MACH NO	PO(PSTIA)	TO(DEC R)	ALPHA-MODEL	ALPHA-SECTOR	ALPHA-PREBEND	ROLL-MODEL	YAW
2A	1	MATED	8.00	800.6	1303	.16	-.16	0	180.00	.00
T-INF	P-INF	Q-INF	V-INF	RMO-INF	MU-INF	RE/FT	MREF	STREF		
(DEC R)	(PSTIA)	(PSTIA)	(FT/SEC)	(SLUGS/FT)	(LB-SEC/FT)	(FT-1)	(R= .0175FT)	(R= .0175FT)		
OP.P	.088	3.949	304A	7.953E-05	7.953E-08	3.660E 06	4.921E-02	2.117E-02		
CAMERA	ROLL NO	PAINT TEMP (DEC F)	INITIAL TEMP (DEC F)	SQUIRE ROOT (RMO/CAK)	TRANSITO	BETA(10)				
TOP IT)	7655									
UPPER SIDE(US)	8049		350	80	.0559	0	0	0		
LOWER SIDE(LS)	7637									
MOTOM(8)	7267									

PIC NO	TIME DELT	M(10)	M(10)/MREF	M(10)	M(10)/MREF	M(10)	M(10)/MREF	M(10)	M(10)/MREF	ST(10)
T 2349(150)	1.15	MODEL HAS NOT REACHED CENTERLINE		2.106E-02	.3292	2.106E-02	.4240	2.480E-02	.5042	6.028E-03
M 4129(150)	1.15	MODEL HAS NOT REACHED CENTERLINE		2.106E-02	.3292	2.106E-02	.4240	2.480E-02	.5042	6.028E-03
US 2357(150)	1.18	MODEL HAS NOT REACHED CENTERLINE		2.106E-02	.3292	2.106E-02	.4240	2.480E-02	.5042	6.028E-03
LS 2360(150)	1.18	MODEL HAS NOT REACHED CENTERLINE		2.106E-02	.3292	2.106E-02	.4240	2.480E-02	.5042	6.028E-03
T 2350(150)	2.25	MODEL HAS NOT REACHED CENTERLINE		1.240E-02	.2622	1.240E-02	.3194	1.967E-02	.3999	5.437E-03
US 2358(150)	2.25	MODEL HAS NOT REACHED CENTERLINE		1.240E-02	.2622	1.240E-02	.3194	1.967E-02	.3999	5.437E-03
M 4130(150)	2.25	MODEL HAS NOT REACHED CENTERLINE		1.240E-02	.2622	1.240E-02	.3194	1.967E-02	.3999	5.437E-03
LS 2361(150)	2.25	MODEL HAS NOT REACHED CENTERLINE		1.240E-02	.2622	1.240E-02	.3194	1.967E-02	.3999	5.437E-03
INJECT TIME	2.60									
T 2351(150)	3.23	1.620E-02	.3292	2.106E-02	.4240	2.480E-02	.5042	6.028E-03		
US 2359(150)	3.23	1.620E-02	.3292	2.106E-02	.4240	2.480E-02	.5042	6.028E-03		
M 4131(150)	3.23	1.620E-02	.3292	2.106E-02	.4240	2.480E-02	.5042	6.028E-03		
LS 2362(150)	3.23	1.620E-02	.3292	2.106E-02	.4240	2.480E-02	.5042	6.028E-03		
T 2352(150)	4.28	1.240E-02	.2622	1.240E-02	.3194	1.967E-02	.3999	5.437E-03		
M 4132(150)	4.28	1.240E-02	.2622	1.240E-02	.3194	1.967E-02	.3999	5.437E-03		
US 2360(150)	4.28	1.240E-02	.2622	1.240E-02	.3194	1.967E-02	.3999	5.437E-03		
LS 2363(150)	4.28	1.240E-02	.2622	1.240E-02	.3194	1.967E-02	.3999	5.437E-03		
T 2353(150)	5.46	1.101E-02	.2237	1.431E-02	.2900	1.680E-02	.3416	4.627E-03		
M 4133(150)	5.46	1.101E-02	.2237	1.431E-02	.2900	1.680E-02	.3416	4.627E-03		
US 2361(150)	5.46	1.101E-02	.2237	1.431E-02	.2900	1.680E-02	.3416	4.627E-03		
LS 2364(150)	5.46	1.101E-02	.2237	1.431E-02	.2900	1.680E-02	.3416	4.627E-03		
T 2354(150)	6.53	9.758E-03	.1903	1.268E-02	.2578	1.494E-02	.3037	4.113E-03		
M 4134(150)	6.53	9.758E-03	.1903	1.268E-02	.2578	1.494E-02	.3037	4.113E-03		
US 2362(150)	6.53	9.758E-03	.1903	1.268E-02	.2578	1.494E-02	.3037	4.113E-03		
LS 2365(150)	6.56	9.734E-03	.1900	1.268E-02	.2572	1.491E-02	.3029	4.102E-03		
T 2355(150)	7.61	8.847E-03	.1800	1.151E-02	.2340	1.356E-02	.2756	3.733E-03		
M 4135(150)	7.61	8.847E-03	.1800	1.151E-02	.2340	1.356E-02	.2756	3.733E-03		
US 2363(150)	7.61	8.847E-03	.1800	1.151E-02	.2340	1.356E-02	.2756	3.733E-03		
LS 2366(150)	7.61	8.847E-03	.1800	1.151E-02	.2340	1.356E-02	.2756	3.733E-03		

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6/29/73

AEDC(ARO-INCH) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL R

NASA-RI ORBITER HEATING

VA289

GROUP	CONFIG	MODEL	MACH NO	PO(PSIA)	TO(DEG R)	ALPHA-MODEL	ALPHA-SECTOR	ALPHA-PREEND	ROLL-MODEL	YAW
2R	1	MATED	8.00	860.5	1363	.16	-.16	0	180.00	.00
T-INF	P-INF	Q-INF	V-INF	RHO-INF	MU-INF	RE/FT	MRFF	STREF		
(DEG R)	(PSIA)	(FT/SEC)	(FT/SEC)	(SLUGS/FT <sup>3</sup> )	(LB-SEC/FT <sup>2</sup> )	(FT-1)	(R= .0175FT)	(R= .0175FT)		
98.8	.088	3.949	38%	7.487E-05	7.952E-08	3.668E 06	4.921E-02	2.117E-02		
CAMERA	ROLL NO	PAINT TEMP (DEG F)	INITIAL TEMP (DEG F)	SQUARE ROOT (RHOXCK)	TRAN(10)	BETA(10)				
TOP(1)	7855									
UPPER SINE(US)	8049									
LOWER SINE(LS)	7837									
BOTTOM(B)	7267									

PIC NO	TIME RELTIME	H(10)	H(10)/HREF	H(1.910)	H(1.910)/HREF	H(1.8510)	H(1.8510)/HREF	ST(10)
US 2363(150)	7.63	8.838E-03	.1796	1.149E-02	.2335	1.354E-02	.2751	3.725E-03
T 2364(150)	8.68	8.166E-03	.1660	1.062E-02	.2158	1.251E-02	.2542	3.442E-03
US 2364(150)	8.68	8.166E-03	.1660	1.062E-02	.2158	1.251E-02	.2542	3.442E-03
LS 2367(150)	8.68	8.166E-03	.1660	1.062E-02	.2158	1.251E-02	.2542	3.442E-03
T 2367(150)	8.68	8.166E-03	.1660	1.062E-02	.2158	1.251E-02	.2542	3.442E-03
US 2367(150)	8.68	8.166E-03	.1660	1.062E-02	.2158	1.251E-02	.2542	3.442E-03
LS 2370(150)	9.74	7.627E-03	.1550	9.915E-03	.2015	1.168E-02	.2374	3.214E-03
T 2370(150)	9.74	7.627E-03	.1550	9.915E-03	.2015	1.168E-02	.2374	3.214E-03
US 2368(150)	9.76	7.615E-03	.1548	9.900E-03	.2012	1.166E-02	.2370	3.209E-03
LS 2368(150)	9.76	7.615E-03	.1548	9.900E-03	.2012	1.166E-02	.2370	3.209E-03
T 2368(150)	9.76	7.615E-03	.1548	9.900E-03	.2012	1.166E-02	.2370	3.209E-03
LS 2369(150)	10.81	7.172E-03	.1458	9.324E-03	.1895	1.098E-02	.2232	3.022E-03
T 2369(150)	10.81	7.172E-03	.1458	9.324E-03	.1895	1.098E-02	.2232	3.022E-03
US 2366(150)	10.81	7.172E-03	.1458	9.324E-03	.1895	1.098E-02	.2232	3.022E-03
LS 2366(150)	10.81	7.172E-03	.1458	9.324E-03	.1895	1.098E-02	.2232	3.022E-03
T 2366(150)	10.81	7.172E-03	.1458	9.324E-03	.1895	1.098E-02	.2232	3.022E-03
US 2370(150)	11.89	6.741E-03	.1380	8.828E-03	.1794	1.040E-02	.2114	2.863E-03
LS 2370(150)	11.89	6.741E-03	.1380	8.828E-03	.1794	1.040E-02	.2114	2.863E-03
T 2370(150)	11.89	6.741E-03	.1380	8.828E-03	.1794	1.040E-02	.2114	2.863E-03
US 2367(150)	11.91	6.741E-03	.1380	8.828E-03	.1794	1.040E-02	.2114	2.863E-03
LS 2367(150)	11.91	6.741E-03	.1380	8.828E-03	.1794	1.040E-02	.2114	2.863E-03
T 2367(150)	11.91	6.741E-03	.1380	8.828E-03	.1794	1.040E-02	.2114	2.863E-03
US 2367(150)	12.56	6.464E-03	.1314	8.403E-03	.1708	9.899E-03	.2012	2.725E-03
LS 2367(150)	12.56	6.464E-03	.1314	8.403E-03	.1708	9.899E-03	.2012	2.725E-03
T 2367(150)	12.56	6.464E-03	.1314	8.403E-03	.1708	9.899E-03	.2012	2.725E-03
US 2368(150)	12.59	6.457E-03	.1312	8.394E-03	.1706	9.888E-03	.2010	2.722E-03
LS 2368(150)	12.59	6.457E-03	.1312	8.394E-03	.1706	9.888E-03	.2010	2.722E-03
T 2368(150)	12.59	6.457E-03	.1312	8.394E-03	.1706	9.888E-03	.2010	2.722E-03
US 2372(150)	14.04	6.140E-03	.1257	8.034E-03	.1634	9.464E-03	.1924	2.607E-03
LS 2372(150)	14.04	6.140E-03	.1257	8.034E-03	.1634	9.464E-03	.1924	2.607E-03
T 2372(150)	14.04	6.140E-03	.1257	8.034E-03	.1634	9.464E-03	.1924	2.607E-03
US 2369(150)	14.07	6.174E-03	.1255	8.026E-03	.1632	9.455E-03	.1922	2.604E-03

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6/29/73

NASA-RI ORBITER HEATING

VA299

AEDC(AR, INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL R

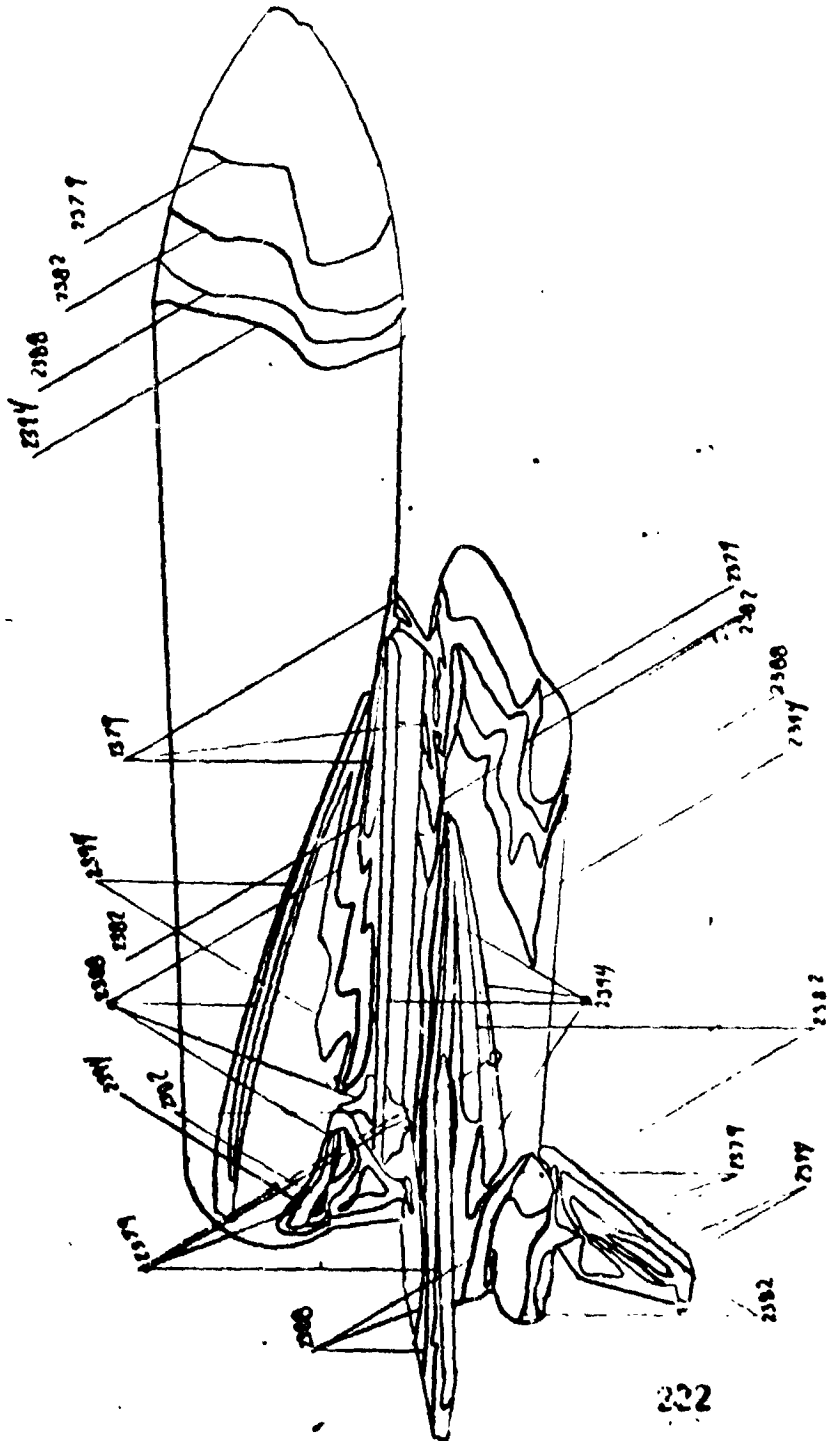
GROUP CONFIG MODEL MACH NO PO(PSTA) T G R ALPHA-MODEL ALPHA-SECTOR ALPHA-PREBEND ROLL-MODEL YAW  
 28 1 7855 4.00 859.8 1363 .16 -.16 0 180.00 .00

T-INF P-INF O-INF V-INF MU-INF RHO-INF RE/FT MREF STREF  
 (DEG R) (PSTA) (PSTA) (FT/SEC) (SLUGS/FT<sup>3</sup>) (LB-SEC/FT<sup>2</sup>) (FT-1) (R<sup>2</sup> .0175FT) (R<sup>2</sup> .0175FT)  
 98.9 .088 3.945 3896 7.422E-05 7.951E-08 3.666E 06 4.918E-02 2.111E-02

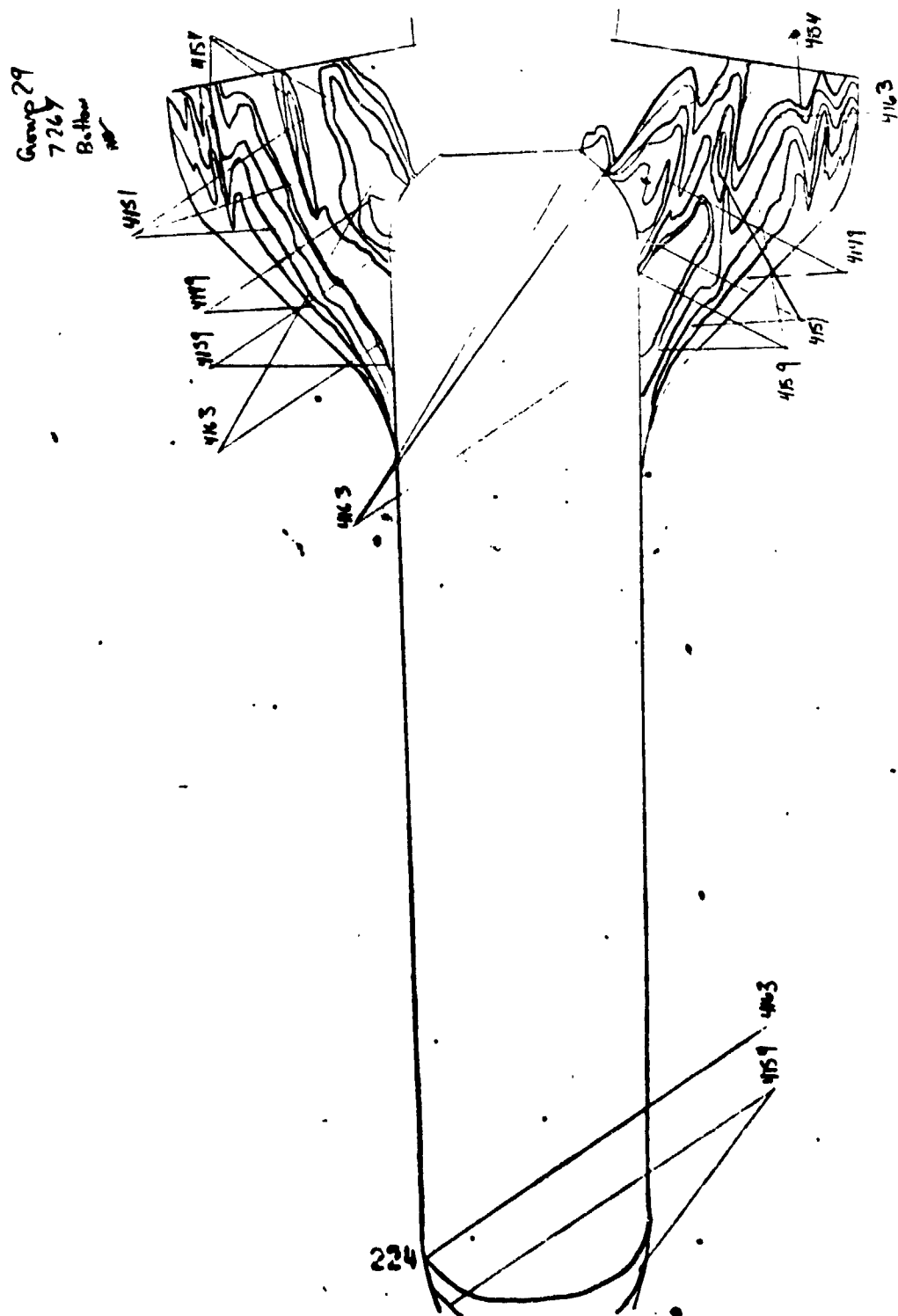
CAMERA ROLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHOXK) T8AR(TO) BETA(TO)  
 TOP(T) 7855  
 UPPER SIDE(US) 8049  
 LOWER SIDE(LS) 7637  
 BOTTOM(B) 7267

PIC NO	TIME	DELTIME	H(TO)	M(TO)/MREF	H(.9TO)	M(.9TO)/MREF	H(.85TO)	M(.85TO)/MREF	ST(TO)
T 2362(350)	15.12	13.61	5.931E-03	.1205	7.710E-03	.1567	9.083E-03	.1846	2.500E-03
M 4152(350)	15.12	13.61	5.931E-03	.1205	7.710E-03	.1567	9.083E-03	.1846	2.500E-03
LS 2373(350)	15.12	13.61	5.931E-03	.1205	7.710E-03	.1567	9.083E-03	.1846	2.500E-03
US 2370(350)	15.14	13.64	5.926E-03	.1204	7.703E-03	.1565	9.074E-03	.1844	2.497E-03
T 8263(350)	16.19	14.69	5.710E-03	.1160	7.422E-03	.1509	8.744E-03	.1777	2.406E-03
US 2371(350)	16.19	14.69	5.710E-03	.1160	7.422E-03	.1508	8.744E-03	.1777	2.406E-03
M 4143(350)	16.19	14.69	5.710E-03	.1160	7.422E-03	.1508	8.744E-03	.1777	2.406E-03
LS 2374(350)	16.19	14.69	5.710E-03	.1160	7.422E-03	.1508	8.744E-03	.1777	2.406E-03
MODEL HAS LEFT CENTERLINE									
T 2364(350)	17.27	15.77	5.511E-03	.1120	7.165E-03	.1456	8.440E-03	.1715	2.323E-03
US 2372(350)	17.27	15.77	5.511E-03	.1120	7.165E-03	.1456	8.440E-03	.1715	2.323E-03
M 4144(350)	17.27	15.77	5.511E-03	.1120	7.165E-03	.1456	8.440E-03	.1715	2.323E-03
LS 2375(350)	17.27	15.77	5.511E-03	.1120	7.165E-03	.1456	8.440E-03	.1715	2.323E-03
T 2365(350)	18.32	16.82	5.336E-03	.1084	6.937E-03	.1410	8.172E-03	.1661	2.249E-03
US 2373(350)	18.32	16.82	5.336E-03	.1084	6.937E-03	.1410	8.172E-03	.1661	2.249E-03
M 4145(350)	18.35	16.84	5.332E-03	.1084	6.932E-03	.1409	8.166E-03	.1660	2.248E-03
LS 2376(350)	18.35	16.84	5.332E-03	.1084	6.932E-03	.1409	8.166E-03	.1660	2.248E-03

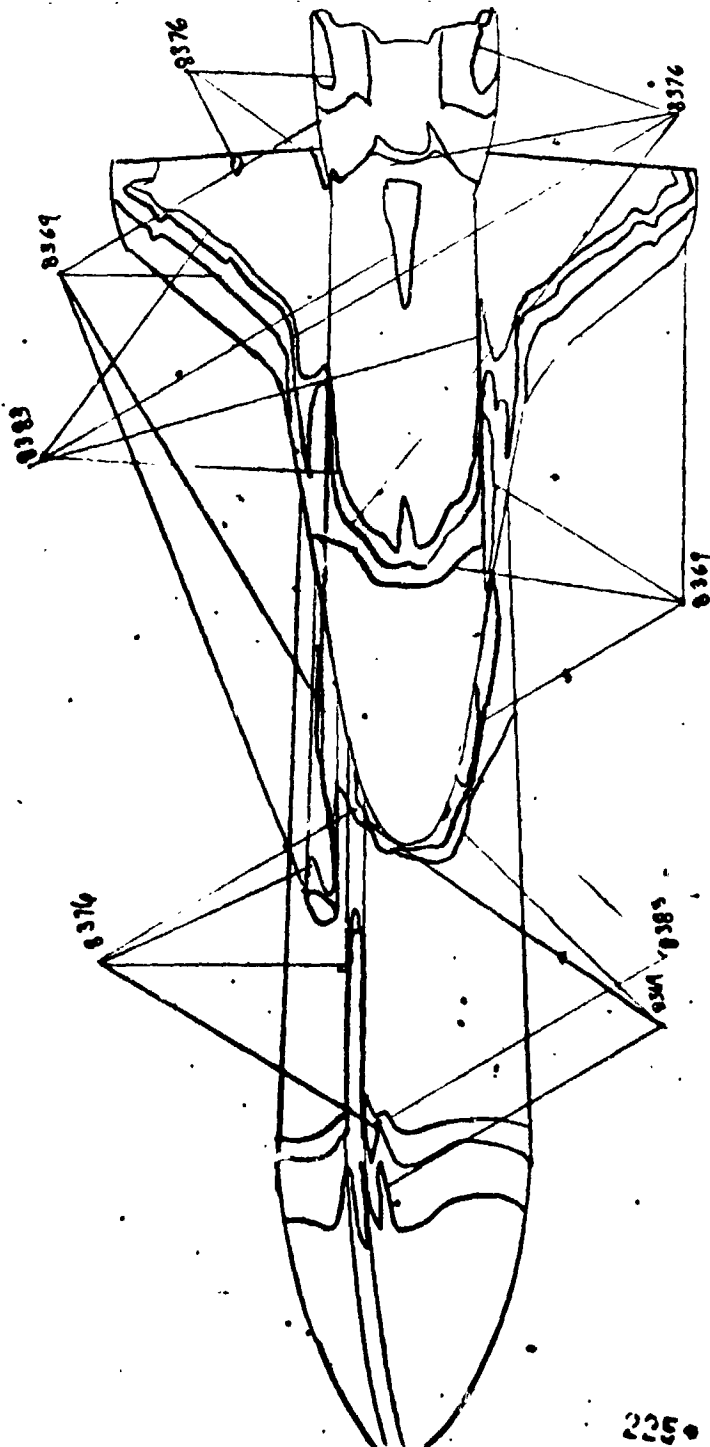
7637  
6P29  
Lower Side







Group 29  
Top  
7855  
NO



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6/29/77

## NASA-RI ORBITER HEATING

VA289

AEDC(ARD)TAC-1 ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL

GROUP	CONFIG	MODEL	MACH NO	POI(PSIA)	TO(DEG R)	ALPHA-MODEL	ALPHA-SECTOR	ALPHA-PREBEND	ROLL-MODEL	YAW
29	1	MAT00	8.00	859.0	1362	-0.15	-0.15	0	0	0
T-INF	P-INF	O-INF	V-INF	RHO-INF	MU-INF	RE/FT	HREF	STREF		
(DEG R)	(PSIA)	(FT/SFC)	(SLUGS/FT <sup>3</sup> )	(LH-SEC/FT <sup>2</sup> )	(FT-1)	(R= .0175FT)	(R= .0175FT)			
9A.7	.088	3.942	3895	7.478E-05	7.948E-08	3.664E 06	4.916E-02	2.118E-02		
CAMERA	ROLL NO	PAINT IFMP	IDEG F	INITIAL TEMP	IDEG F	SQUARE ROOT (RHO/CXKK)	TBAR(10)	BETA(10)		
TOP(1)	7855			79		.0496				
HPDFR SIDE(US)	8049									
LOWFR SIDE(LS)	7637									
WOTTCM(19)	7267									

PIC NO	TIME DELTIME	W(10)	W(10)/HREF	M(.910)	M(.8510)/HREF	M(.8510)	M(.8510)/HREF	SI(10)
T 8366(150)	1.15	MODEL WAS NOT REACHED CENTERLINE	0.017	3.690E-03	0.0751	4.136E-03	0.0841	1.294E-03
M 4146(150)	3.20	MODEL WAS NOT REACHED CENTERLINE	0.017	3.690E-03	0.0751	4.136E-03	0.0841	1.294E-03
LS 2377(150)	1.15	MODEL WAS NOT REACHED CENTERLINE	0.017	3.690E-03	0.0751	4.136E-03	0.0841	1.294E-03
US 8374(150)	1.18	MODEL WAS NOT REACHED CENTERLINE	0.013	3.665E-03	0.0745	4.108E-03	0.0836	1.285E-03
T 8364(150)	4.38	2.400E-03	0.088	2.919E-03	0.0504	3.272E-03	0.0666	1.024E-03
M 4164(150)	4.38	2.400E-03	0.088	2.919E-03	0.0504	3.272E-03	0.0666	1.024E-03
LS 2380(150)	4.38	2.400E-03	0.088	2.919E-03	0.0504	3.272E-03	0.0666	1.024E-03
US 8377(150)	4.41	2.340E-03	0.086	2.907E-03	0.0591	3.258E-03	0.0653	1.019E-03
T 8370(150)	5.46	2.048E-03	0.086	2.490E-03	0.0506	2.792E-03	0.0568	8.732E-04
US 8376(150)	5.46	2.048E-03	0.086	2.490E-03	0.0506	2.792E-03	0.0568	8.732E-04
M 4150(150)	5.46	2.048E-03	0.086	2.490E-03	0.0506	2.792E-03	0.0568	8.732E-04
LS 2381(150)	5.46	2.048E-03	0.086	2.490E-03	0.0506	2.792E-03	0.0568	8.732E-04
T 8371(150)	6.53	1.815E-03	0.089	2.208E-03	0.0449	2.475E-03	0.0503	7.737E-04
US 8372(150)	6.53	1.815E-03	0.089	2.208E-03	0.0449	2.475E-03	0.0503	7.737E-04
M 4151(150)	6.53	1.815E-03	0.089	2.208E-03	0.0449	2.475E-03	0.0503	7.737E-04
LS 2382(150)	6.53	1.815E-03	0.089	2.208E-03	0.0449	2.475E-03	0.0503	7.737E-04
T 8373(150)	7.61	1.648E-03	0.035	2.004E-03	0.0407	2.246E-03	0.0457	7.023E-04
US 8380(150)	7.61	1.648E-03	0.035	2.004E-03	0.0407	2.246E-03	0.0457	7.023E-04
M 4152(150)	7.61	1.648E-03	0.035	2.004E-03	0.0407	2.246E-03	0.0457	7.023E-04
LS 2383(150)	7.61	1.648E-03	0.035	2.004E-03	0.0407	2.246E-03	0.0457	7.023E-04

INJECT TIME = 2.68

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6/29/73

NASA-RI ORBITER HEATING

AEDC(ARO-INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL R

VA289

GROUP CONFIG MODEL MACH NO PO(PISA) TO( DEG R) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREBEND ROLL-MODEL YAW  
 29 1 MATED 8.00 859.8 1362 -.15 -.15 0 0  
 1-INF P-INF O-INF V-INF MU-INF RE/FT MREF STREF  
 (DEG R) (PSIA) (FT/SEC) (SLUGS/FT<sup>3</sup>) (LR-SEC/FT<sup>2</sup>) (FT-1) (R=.0175FT) (R=.0175FT)  
 9a.7 .008 3.945 3695 7.446E-05 7.947E-08 3.669E 06 4.918E-02 2.117E-02  
 CAMERA ROLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHOCXK) TRAR(TO) BETA(TO)  
 TOP(L) 7855  
 UPPER SIDE(LS) 8949  
 LOWER SIDE(LS) 7237  
 BOTTOM(LS) 7267

PIC NO TIME DELT/SEC M(TO) MREF M(TO)/MREF M(-95TO) M(-95TO)/MREF M(-95TO) M(-95TO)/MREF ST(TO)  
 T 8373(150) 0.66 7.16 1.522E-03 .0309 1.051E-01 .0376 2.075E-03 .0422 6.485E-04  
 M 4151(150) 0.66 7.16 1.522E-03 .0309 1.051E-01 .0376 2.075E-03 .0422 6.485E-04  
 LS 2386(150) 0.68 7.16 1.519E-03 .0309 1.048E-01 .0376 2.071E-03 .0421 6.475E-04  
 T 8374(150) 0.68 7.16 1.519E-03 .0309 1.048E-01 .0376 2.071E-03 .0421 6.475E-04  
 M 4154(150) 9.74 8.23 1.419E-03 .0289 1.041E-01 .0351 1.934E-03 .0393 6.052E-04  
 LS 2385(150) 9.74 8.23 1.419E-03 .0289 1.041E-01 .0351 1.934E-03 .0393 6.052E-04  
 T 8375(150) 9.76 8.24 1.417E-03 .0288 1.039E-01 .0350 1.931E-03 .0393 6.043E-04  
 M 4155(150) 10.81 9.31 1.334E-03 .0271 1.033E-01 .0330 1.819E-03 .0370 5.688E-04  
 LS 2386(150) 10.81 9.31 1.334E-03 .0271 1.033E-01 .0330 1.819E-03 .0370 5.688E-04  
 T 8376(150) 10.84 9.33 1.333E-03 .0271 1.032E-01 .0330 1.817E-03 .0369 5.680E-04  
 M 4156(150) 11.89 10.39 1.263E-03 .0257 1.025E-01 .0312 1.722E-03 .0350 5.384E-04  
 LS 2387(150) 11.89 10.39 1.263E-03 .0257 1.025E-01 .0312 1.722E-03 .0350 5.384E-04  
 T 8377(150) 11.91 10.41 1.262E-03 .0257 1.025E-01 .0312 1.720E-03 .0350 5.377E-04  
 M 4157(150) 12.96 11.44 1.203E-03 .0245 1.020E-01 .0297 1.639E-03 .0333 5.125E-04  
 LS 2388(150) 12.96 11.44 1.203E-03 .0245 1.020E-01 .0297 1.639E-03 .0333 5.125E-04  
 T 8378(150) 14.04 12.54 1.201E-03 .0244 1.018E-01 .0297 1.638E-03 .0333 5.119E-04  
 M 4158(150) 14.04 12.54 1.201E-03 .0244 1.018E-01 .0297 1.638E-03 .0333 5.119E-04  
 LS 2389(150) 14.04 12.54 1.201E-03 .0244 1.018E-01 .0297 1.638E-03 .0333 5.119E-04  
 T 8379(150) 15.12 13.61 1.103E-03 .0224 1.003E-01 .0273 1.504E-03 .0306 4.701E-04  
 M 4159(150) 15.12 13.61 1.103E-03 .0224 1.003E-01 .0273 1.504E-03 .0306 4.701E-04  
 LS 2390(150) 15.12 13.61 1.103E-03 .0224 1.003E-01 .0273 1.504E-03 .0306 4.701E-04

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6/29/73

## NASA-RI ORBITER HEATING

VA289

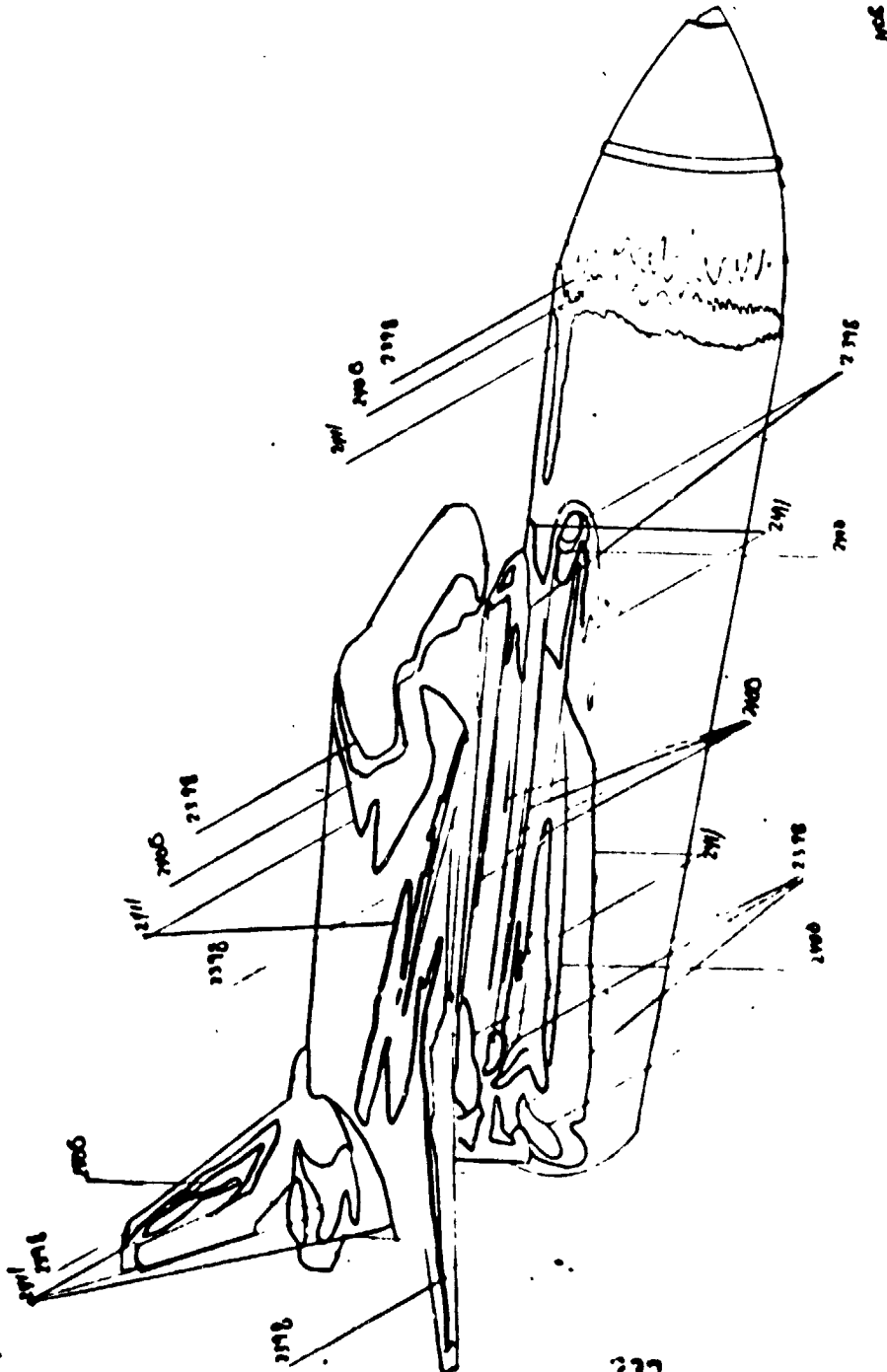
AEDC(ARO,INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL W

GROUP	CONFIG	MODEL	MACH NO	PO(PSIA)	TO(DEG R)	ALPHA-MODEL	ALPHA-SECTOR	ALPHA-PREBEND	ROLL-MODEL	YAW
29	1	MATED	8.00	860.1	1362	-.15	-.15	0	0	0
T-1AF	P-TNF	Q-TNF	V-TNF	RHO-TNF	MU-TNF	PE/FT	MREF	STREF		
IDEG R	(PSIA)	(PSIA)	(FT/SEC)	(SLUGS/FT3)	(LB-SEC/FT2)	(FT-1)	(R=.0175FT)	(R=.0175FT)		
98.7	.088	3.947	3895	7.489E-05	7.947E-08	3.670E-06	4.919E-02	2.116E-02		
CAMFRA	ROLL NO	PAINT TEMP (DEG F)	INITIAL TEMP (DEG F)	SQUARE ROOT (RHOXCK)	TBAR(TO)	BETA(TO)				
TOP(T)	7855									
UPPER SIDE(US)	8049	150	79	.0496			8.626E-02	8.2083E-02		
LOWER SIDE(LS)	7637									
MOTTCM(R)	7267									

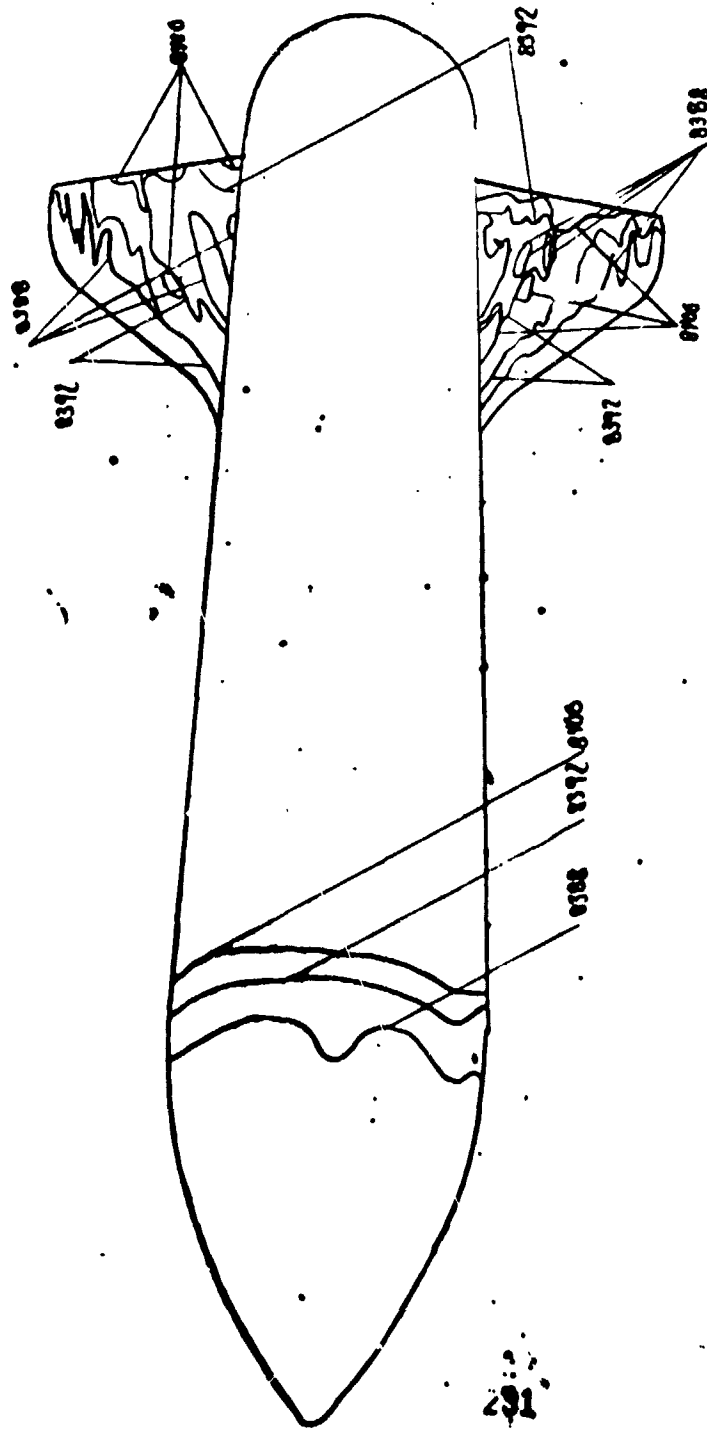
PTC NO	TIME	DELTIME	H(TO)	H(TO)/HREF	M(.9TO)	M(.9TO)/HREF	M(.85TO)	M(.85TO)/HREF	ST(TO)
T 4380(150)	16.19	14.69	1.062E-03	.0216	1.292E-03	.0263	1.448E-03	.0294	4.526E-04
US 4380(150)	16.19	14.69	1.062E-03	.0216	1.292E-03	.0263	1.448E-03	.0294	4.526E-04
M 4160(150)	16.19	14.69	1.062E-03	.0216	1.292E-03	.0263	1.448E-03	.0294	4.526E-04
LS 2391(150)	16.19	14.69	1.062E-03	.0216	1.292E-03	.0263	1.448E-03	.0294	4.526E-04
T 4381(150)	17.27	15.77	1.062E-03	.0208	1.247E-03	.0253	1.398E-03	.0284	4.368E-04
US 4381(150)	17.27	15.77	1.062E-03	.0208	1.247E-03	.0253	1.398E-03	.0284	4.368E-04
M 4161(150)	17.27	15.77	1.062E-03	.0208	1.247E-03	.0253	1.398E-03	.0284	4.368E-04
LS 2392(150)	17.27	15.77	1.062E-03	.0208	1.247E-03	.0253	1.398E-03	.0284	4.368E-04
T 4162(150)	18.35	16.84	9.920E-04	.0202	1.206E-03	.0245	1.352E-03	.0275	4.231E-04
US 4162(150)	18.35	16.84	9.920E-04	.0202	1.206E-03	.0245	1.352E-03	.0275	4.231E-04
LS 2393(150)	18.35	16.84	9.920E-04	.0202	1.206E-03	.0245	1.352E-03	.0275	4.231E-04
M 4163(150)	19.40	17.89	9.618E-04	.0196	1.170E-03	.0238	1.312E-03	.0267	4.101E-04
T 4383(150)	19.42	17.92	9.618E-04	.0196	1.170E-03	.0238	1.312E-03	.0267	4.099E-04
US 4383(150)	19.42	17.92	9.618E-04	.0196	1.170E-03	.0238	1.312E-03	.0267	4.099E-04
LS 2394(150)	19.42	17.92	9.618E-04	.0196	1.170E-03	.0238	1.312E-03	.0267	4.099E-04
MODEL WAS LEFT CENTERLINE									
T 4384(150)	20.47	18.97	9.348E-04	.0190	1.137E-03	.0231	1.274E-03	.0259	3.982E-04
US 4384(150)	20.47	18.97	9.348E-04	.0190	1.137E-03	.0231	1.274E-03	.0259	3.982E-04
LS 2395(150)	20.50	19.00	9.348E-04	.0190	1.136E-03	.0231	1.273E-03	.0259	3.981E-04
M 4164(150)	20.50	19.00	9.348E-04	.0190	1.136E-03	.0231	1.273E-03	.0259	3.981E-04



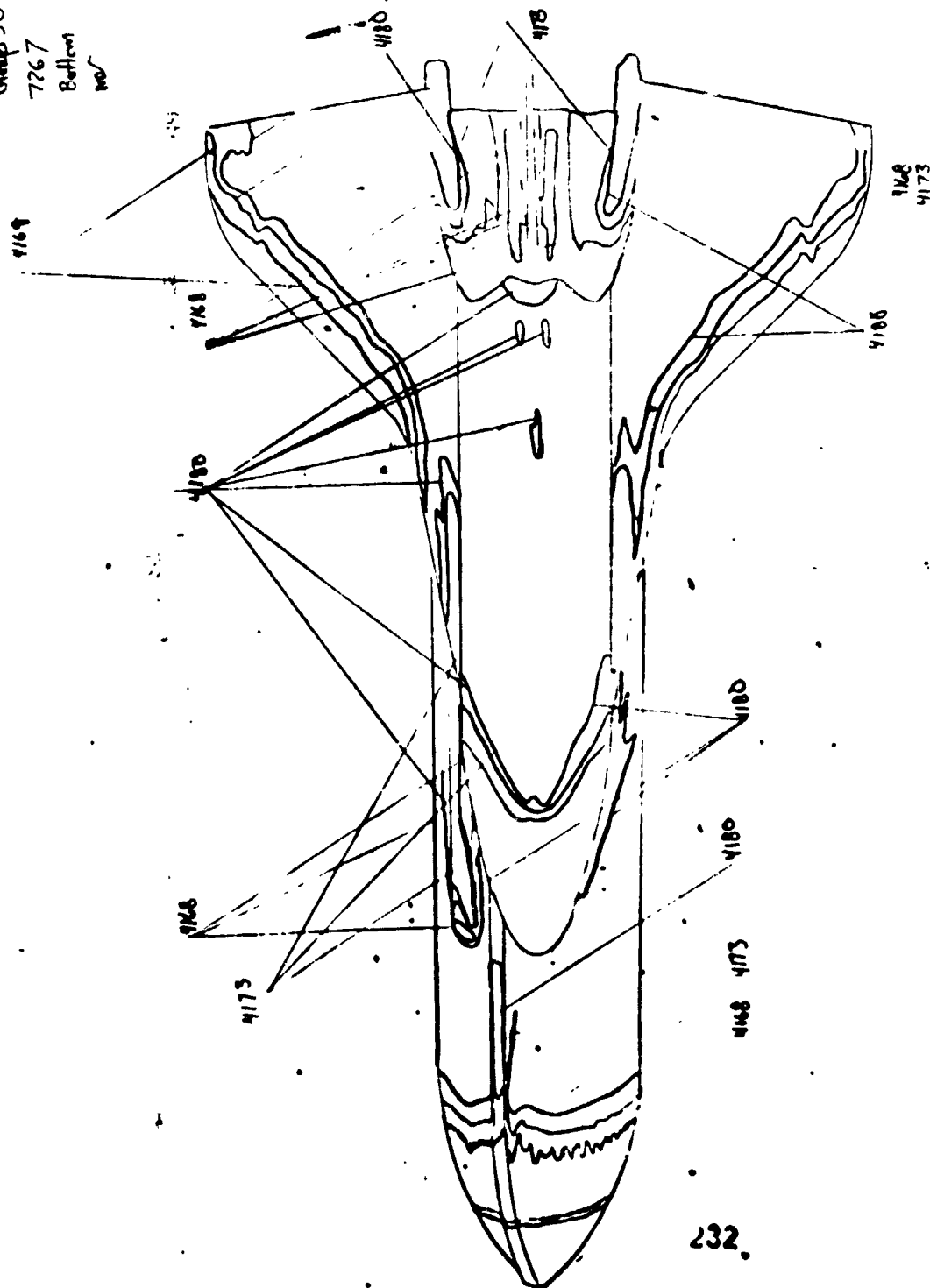
7657  
GP 30  
Lower Side



Group 30  
Top  
7855  
100



Group 30  
7267  
Bottom  
no



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# NASA-RI ORBITER HEATING

WAZ89

AEDC(AR, INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL R

6/29/73

GROUP	CINFIG	MODEL	MACH NO	POI(PSIA)	TOIDEG R	ALPHA-MODEL	ALPHA-SECTOR	ALPHA-PREBEMO	ROLL-MODEL	YAW
30	1	MATED	8.00	857.4	1368	.16	-.10	0	180.00	.00
T-1AF	P-1AF	Q-1AF	V-1AF	RNO-1AF	MU-1AF	RE/FT	MREF	CTRES		
(DEG R)	(PSIA)	(FT/SEC)	(SLUGS/FT <sup>3</sup> )	(LB-SEC/FT <sup>2</sup> )	(FT-1)	(R= .0175FT)	(R= .0175FT)			
99.1	.608	3.934	3902	7.435E-05	7.979E-08	3.636E 06	4.915E-02	2.125E-02		
CAMERA	ROLL NO	PAINT TEMP (DEG F)	INITIAL TEMP (DEG F)	SQUARE ROOT (RMORCK)	TBAR(TO)	BETA(TO)				
TOP(T)	7555									
UPPER SIDE(LS)	8049	150	80	.0496	0	0				
LOWER SIDE(LS)	7577									
BOTTOM(R)	7267									

PIC NO	TYPE	RELTIME	M(TO)	M(TO)/MREF	M(.85TO)	M(.85TO)/MREF	ST(TO)
T 0105(150)	1-13	1.79	2.979E-03	.0674	3.621E-03	.0736	4.058E-03
T 0105(150)	1-13	1.81	2.957E-03	.0601	3.596E-03	.0731	4.030E-03
US 0105(150)	1-13	1.81	2.957E-03	.0601	3.596E-03	.0731	4.030E-03
LS 0105(150)	1-13	1.81	2.957E-03	.0601	3.596E-03	.0731	4.030E-03
T 0106(150)	2-20	2.47	2.353E-03	.0474	2.641E-03	.0541	3.206E-03
US 0106(150)	2-20	2.49	2.363E-03	.0474	2.649E-03	.0579	3.193E-03
LS 0106(150)	2-20	2.49	2.363E-03	.0474	2.649E-03	.0579	3.193E-03
T 0109(150)	5-43	3.04	2.006E-03	.0404	2.431E-03	.0496	2.734E-03
US 0109(150)	5-43	3.04	2.006E-03	.0404	2.431E-03	.0496	2.734E-03
LS 0109(150)	5-43	3.04	2.006E-03	.0404	2.431E-03	.0496	2.734E-03
T 0110(150)	6-51	5.02	1.778E-03	.0361	2.162E-03	.0419	2.423E-03
US 0110(150)	6-51	5.04	1.774E-03	.0361	2.157E-03	.0419	2.417E-03
LS 0110(150)	6-51	5.04	1.774E-03	.0361	2.157E-03	.0419	2.417E-03
T 0111(150)	7-58	6.00	1.614E-03	.0328	1.962E-03	.0399	2.199E-03
US 0111(150)	7-58	6.00	1.614E-03	.0328	1.962E-03	.0399	2.199E-03
LS 0111(150)	7-58	6.00	1.614E-03	.0328	1.962E-03	.0399	2.199E-03

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6/20/73

NASA-RI ORBITER HEATING  
VA209

AEDC(ARC-INC.) ARNOLD AFS, TENNESSEE  
VON KARMAN GAS DYNAMICS FACILITY  
50 INCH HYPERSONIC TUNNEL R

GROUP CONFIG MODEL MACH NO PO(PST) T JEG R ALPHA-MODEL ALPHA-SECTOR ALPHA-PREBEND ROLL-MODEL YAW  
30 1 MATED 8.00 859.6 1368 .16 .16 0 180.00 .00

T-INF P-INF Q-INF V-INF RHO-INF MU-INF ME/FT MREF STREF  
(DEG R) (PSIA) (PSIA) (FT/SEC) (SLUGS/FT3) (LR-SEC/FT2) (FT-1) (R=.0175FT) (R=.0175FT)  
99.1 .088 3.945 3902 7.455E-05 7.978E-08 3.646E 06 4.921E-02 2.122E-02

CAMERA ROLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RMOCKXK) TRAR(TO) BETA(TO)  
TOP(T) 7855 80 .0496 8.456E-02 8.0309E-02  
UPPER SIDE(US) 8049 150  
LOWER SIDE(LS) 7637  
MIDTOM(R) 7267

PIC NO	TIME DELTIME	H(TO)	H(TO)/MREF	H(.9TO)	H(.9TO)/MREF	H(1.85TO)	H(1.85TO)/MREF	ST(TO)
US A399(150)	7.61	1.610E-03	.0327	1.958E-03	.0398	2.194E-03	.0446	6.878E-04
LS A402(150)	7.61	1.610E-03	.0327	1.958E-03	.0398	2.194E-03	.0446	6.878E-04
T A392(150)	7.61	1.488E-03	.0302	1.809E-03	.0368	2.027E-03	.0412	6.356E-04
H A172(150)	7.61	1.488E-03	.0302	1.809E-03	.0368	2.027E-03	.0412	6.356E-04
US A405(150)	8.68	1.485E-03	.0302	1.805E-03	.0367	2.023E-03	.0411	6.346E-04
LS A403(150)	8.68	1.485E-03	.0302	1.805E-03	.0367	2.023E-03	.0411	6.346E-04
T A393(150)	8.25	1.347E-03	.0282	1.687E-03	.0343	1.890E-03	.0384	5.922E-04
H A173(150)	8.25	1.347E-03	.0282	1.687E-03	.0343	1.890E-03	.0384	5.922E-04
US A401(150)	9.76	1.385E-03	.0281	1.684E-03	.0342	1.887E-03	.0383	5.913E-04
LS A404(150)	9.76	1.385E-03	.0281	1.684E-03	.0342	1.887E-03	.0383	5.913E-04
T A394(150)	9.32	1.305E-03	.0265	1.586E-03	.0322	1.778E-03	.0361	5.570E-04
H A174(150)	9.32	1.305E-03	.0265	1.586E-03	.0322	1.778E-03	.0361	5.570E-04
US A402(150)	10.84	1.303E-03	.0265	1.584E-03	.0322	1.775E-03	.0361	5.563E-04
LS A405(150)	10.84	1.303E-03	.0265	1.584E-03	.0322	1.775E-03	.0361	5.563E-04
T A395(150)	11.89	1.235E-03	.0251	1.502E-03	.0305	1.683E-03	.0342	5.279E-04
H A175(150)	11.89	1.235E-03	.0251	1.502E-03	.0305	1.683E-03	.0342	5.279E-04
US A403(150)	11.89	1.235E-03	.0251	1.502E-03	.0305	1.683E-03	.0342	5.279E-04
LS A404(150)	11.89	1.235E-03	.0251	1.502E-03	.0305	1.683E-03	.0342	5.279E-04
T A396(150)	12.56	1.176E-03	.0239	1.430E-03	.0291	1.602E-03	.0326	5.020E-04
H A176(150)	12.56	1.176E-03	.0239	1.430E-03	.0291	1.602E-03	.0326	5.020E-04
US A401(150)	12.56	1.176E-03	.0239	1.430E-03	.0291	1.602E-03	.0326	5.020E-04
LS A402(150)	12.56	1.176E-03	.0239	1.430E-03	.0291	1.602E-03	.0326	5.020E-04
T A397(150)	12.55	1.124E-03	.0228	1.367E-03	.0278	1.532E-03	.0311	4.801E-04
H A177(150)	12.55	1.124E-03	.0228	1.367E-03	.0278	1.532E-03	.0311	4.801E-04
US A404(150)	12.55	1.124E-03	.0228	1.367E-03	.0278	1.532E-03	.0311	4.801E-04
LS A405(150)	12.55	1.124E-03	.0228	1.367E-03	.0278	1.532E-03	.0311	4.801E-04

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6/29/73

# MASA-RI ORBITER HEATING

VA289

AEDC(ARJ,INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL R

GROUP	CONFIG	MODEL	MACH NO	PO(PsIA)	TO(DEG R)	ALPHA-MODEL	ALPHA-SECTOR	ALPHA-PREBEND	ROLL-MODEL	YAW
30	1	MATED	8.00	859.6	1368	.16	-.16	0	180.00	.00

T-INF	P-INF	Q-INF	V-INF	RHO-INF	MU-INF	RE/FT	HREF	STREF
(DEG R)	(PSIA)	(FT/SEC)	(SLUGS/FT <sup>3</sup> )	(LB-SEC/FT <sup>2</sup> )	(FT-1)	(R= .0175FT)	(R= .0175FT)	(R= .0175FT)

92.1	.088	3.945	3902	7.4454E-05	7.979F-08	3.646E 06	4.921E-02	2.122E-02
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CAMERA	ROLL NO	PAINT TEMP (DEG F)	INITIAL TEMP (DEG F)	SQUARE ROOT (RHOXCXK)	TBAR(TO)	BETA(TO)
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TOP(T)	7855	80	-.0494	8.456E-02	8.0309E-02
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UPPER SIDE(US)	8049
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LOWER SIDE(LS)	7637
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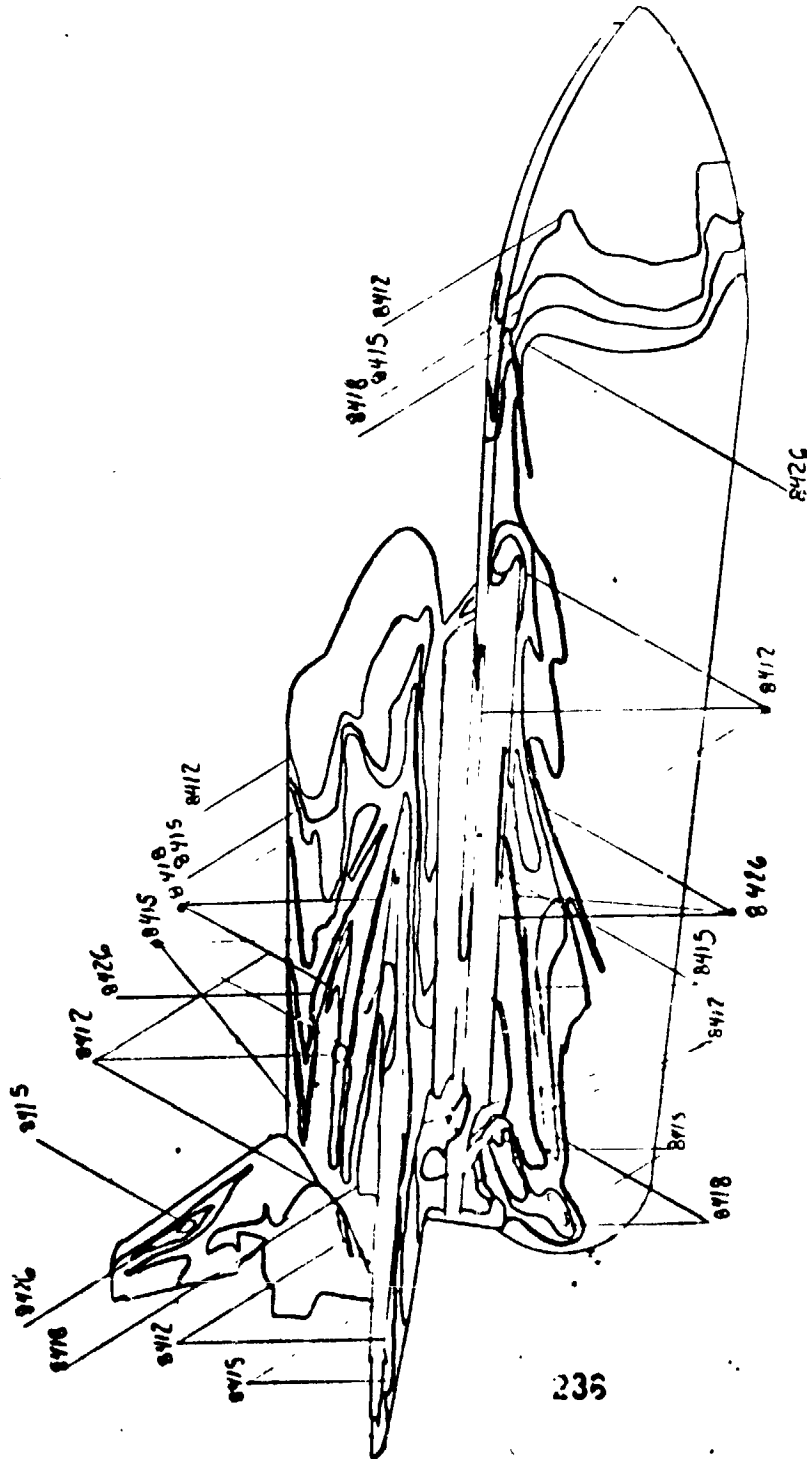
BOTTOM(B)	7267
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PIC NO	TIME DELTIME	H(TO)	H(TO)/HREF	H(.9TO)	H(.9TO)/HREF	H(.85TO)	H(.85TO)/HREF	ST(TO)
US A405(150)	14.07 17.58	1.123E-03	.0228	1.366E-03	.0278	1.531E-03	.0311	4.797E-04
T A394(150)	15.12 13.63	1.079E-03	.0219	1.312E-03	.0267	1.470E-03	.0299	4.605E-04
R A178(150)	15.12 13.63	1.079E-03	.0219	1.312E-03	.0267	1.470E-03	.0299	4.605E-04
LS A409(150)	15.12 13.63	1.079E-03	.0219	1.312E-03	.0267	1.470E-03	.0299	4.605E-04
US A406(150)	15.14 13.65	1.078E-03	.0219	1.311E-03	.0266	1.469E-03	.0298	4.600E-04
T A399(150)	16.19 14.70	1.039E-03	.0211	1.263E-03	.0257	1.416E-03	.0288	4.432E-04
R A179(150)	16.19 14.70	1.039E-03	.0211	1.263E-03	.0257	1.416E-03	.0288	4.432E-04
LS A410(150)	16.19 14.70	1.039E-03	.0211	1.263E-03	.0257	1.416E-03	.0288	4.432E-04
US A407(150)	16.22 14.73	1.038E-03	.0211	1.262E-03	.0256	1.414E-03	.0287	4.429E-04
T A400(150)	17.27 15.78	1.003E-03	.0204	1.219E-03	.0248	1.366E-03	.0278	4.280E-04
M A130(150)	17.27 15.78	1.003E-03	.0204	1.219E-03	.0248	1.366E-03	.0278	4.280E-04
LS A411(150)	17.27 15.78	1.003E-03	.0204	1.219E-03	.0248	1.366E-03	.0278	4.280E-04
US A408(150)	17.29 15.81	1.002E-03	.0204	1.218E-03	.0247	1.365E-03	.0277	4.275E-04
T A401(150)	18.35 16.84	9.702E-04	.0197	1.180E-03	.0240	1.322E-03	.0269	4.139E-04
R A181(150)	18.35 16.84	9.702E-04	.0197	1.180E-03	.0240	1.322E-03	.0269	4.139E-04
LS A412(150)	18.35 16.84	9.702E-04	.0197	1.180E-03	.0240	1.322E-03	.0269	4.139E-04
US A409(150)	18.37 16.88	9.695E-04	.0197	1.179E-03	.0239	1.321E-03	.0268	4.137E-04

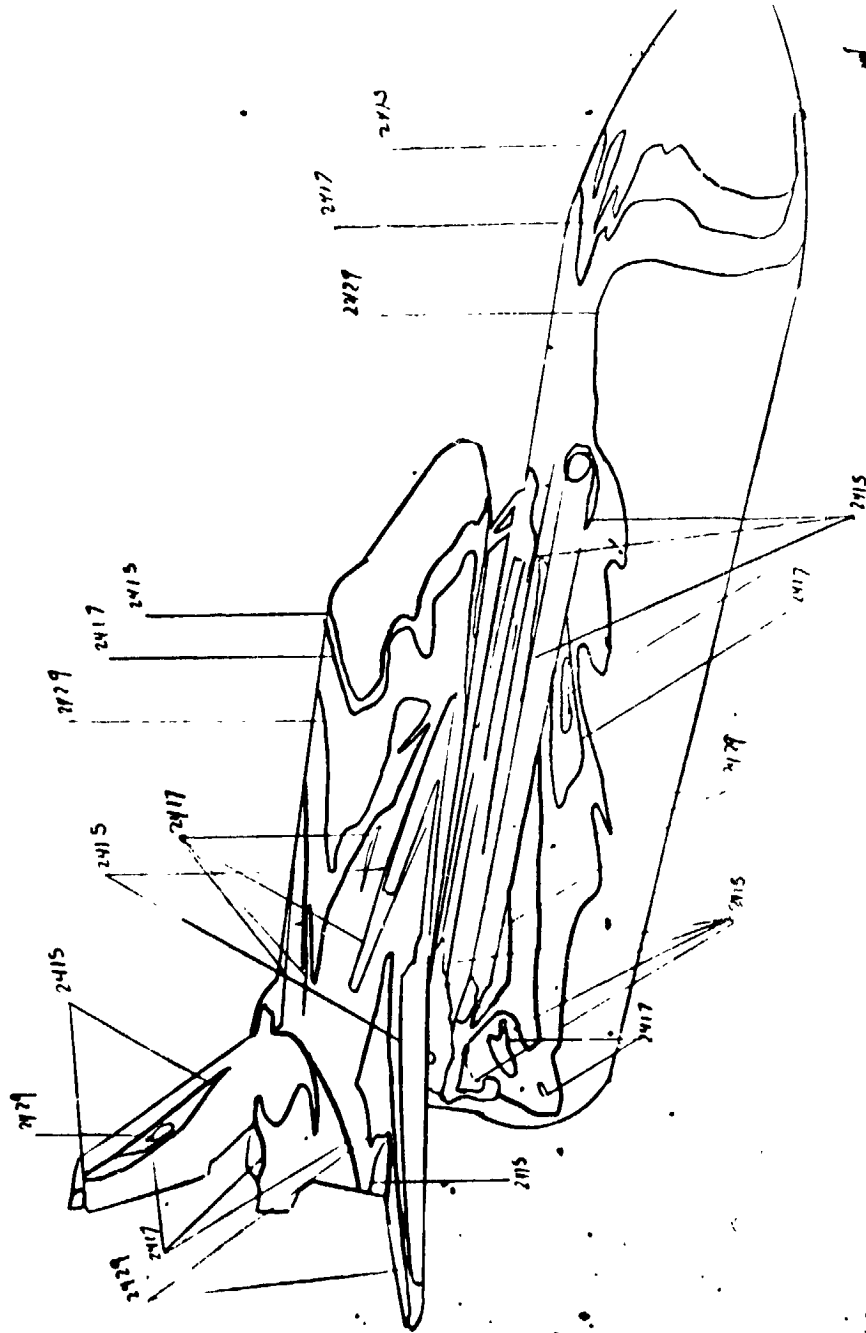
MODEL HAS LEFT CENTERLINE



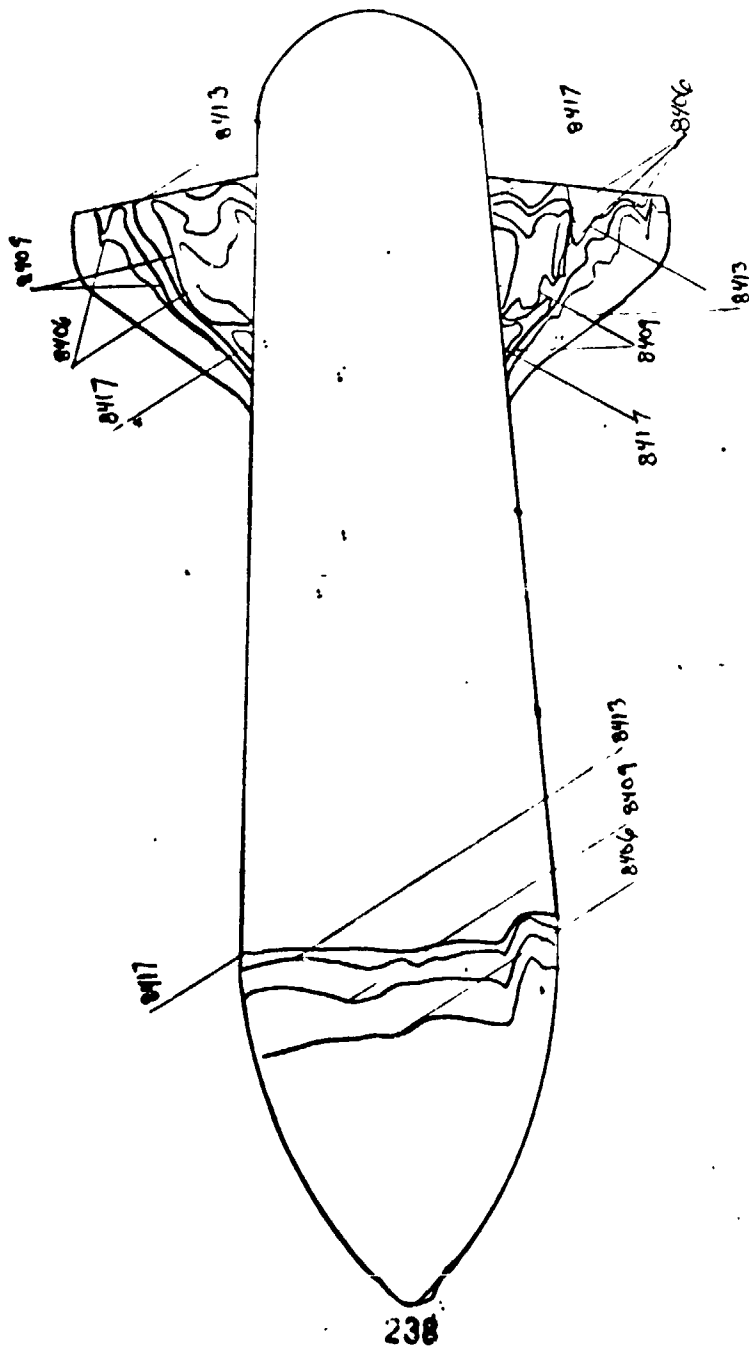
8049  
C.P. 31  
Upper Side



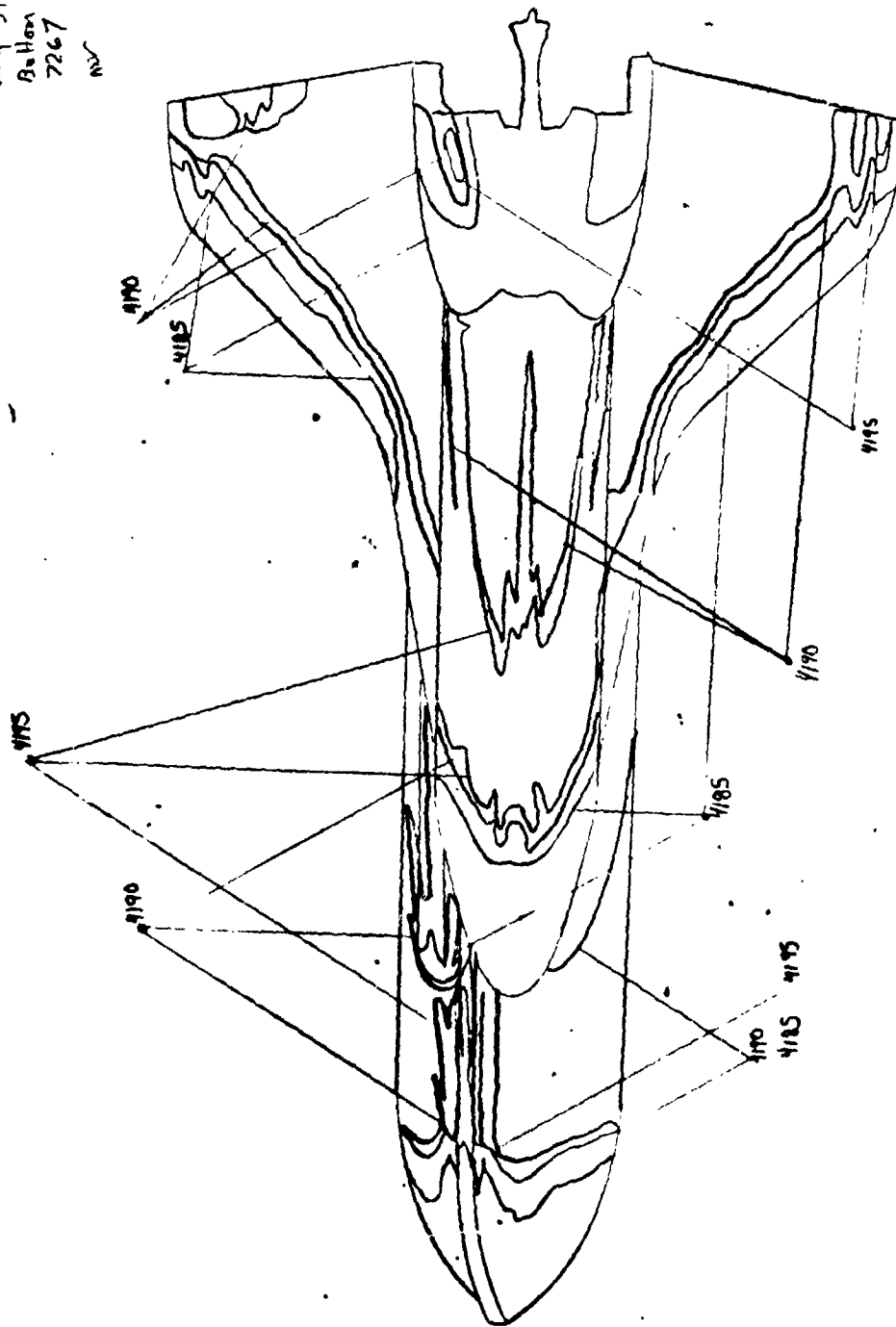
7637  
CP 51  
Lower Side



Group 3/1  
Top  
7855  
no



Group 51  
Bottom  
7267  
NW



33

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6/29/73

## NASA-RI ORBITER HEATING

AEOC(ARO,INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL R

V4289

GROUP CNFRTG MODEL MACH NO PO(PSIA) TO(DEG R) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREBEND ROLL-MODEL YAW  
 31 1 MATED 8.00 859.0 1359 -4.86 4.86 0 180.00 -0.00

T-INF P-INF Q-INF V-INF MU-INF RE/FT HREF STREF  
 (DEG R) (PSIA) (FT/SEC) (SLUGS/FT<sup>3</sup>) (LR-SEC/FT<sup>2</sup>) (FT-1) (R=.0175FT) (R=.0175FT)  
 98.5 .088 3.942 3891 7.494E-05 7.931E-08 3.676E 06 4.914E-02 2.115E-02

CAMERA ROLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RH0XCXK) TRAR(TO) BETA(TO)  
 TOP(T) 7855  
 UPPER SIDE(US) 8049  
 LOWER SIDE(LS) 7637  
 MOTTCH(B) 7667

PTC NO	TYPE	DELTIME	HIT0)	HIT0)/HREF	H1(9T0)	H1(85T0)	H1(85T0)/HREF	ST(T0)
T 8402(150)	1.15	1.81	MODEL HAS NOT REACHED CENTERLINE	0.609	3.640E-03	0.741	4.082E-03	0.831
M 8402(150)	1.15	1.81	MODEL HAS NOT REACHED CENTERLINE	0.609	3.640E-03	0.741	4.082E-03	0.831
LS 2413(150)	1.15	1.81	MODEL HAS NOT REACHED CENTERLINE	0.609	3.640E-03	0.741	4.082E-03	0.831
US 8410(150)	1.18	1.84	MODEL HAS NOT REACHED CENTERLINE	0.605	3.615E-03	0.736	4.054E-03	0.825
T 8403(150)	2.23	2.89	MODEL HAS NOT REACHED CENTERLINE	0.682	2.884E-03	0.587	3.234E-03	0.658
M 8403(150)	2.23	2.89	MODEL HAS NOT REACHED CENTERLINE	0.682	2.884E-03	0.587	3.234E-03	0.658
LS 2414(150)	2.23	2.89	MODEL HAS NOT REACHED CENTERLINE	0.680	2.871E-03	0.584	3.220E-03	0.656
US 8411(150)	2.25	2.92	MODEL HAS NOT REACHED CENTERLINE	0.680	2.871E-03	0.584	3.220E-03	0.656
T 8404(150)	2.65	3.30	MODEL HAS NOT REACHED CENTERLINE	0.609	3.640E-03	0.741	4.082E-03	0.831
M 8404(150)	2.65	3.30	MODEL HAS NOT REACHED CENTERLINE	0.609	3.640E-03	0.741	4.082E-03	0.831
LS 2415(150)	3.30	3.97	MODEL HAS NOT REACHED CENTERLINE	0.609	3.640E-03	0.741	4.082E-03	0.831
US 8412(150)	3.33	3.97	MODEL HAS NOT REACHED CENTERLINE	0.605	3.615E-03	0.736	4.054E-03	0.825
T 8405(150)	4.38	4.41	MODEL HAS NOT REACHED CENTERLINE	0.682	2.884E-03	0.587	3.234E-03	0.658
M 8405(150)	4.38	4.41	MODEL HAS NOT REACHED CENTERLINE	0.682	2.884E-03	0.587	3.234E-03	0.658
LS 2416(150)	4.41	4.41	MODEL HAS NOT REACHED CENTERLINE	0.680	2.871E-03	0.584	3.220E-03	0.656
US 8413(150)	4.41	4.41	MODEL HAS NOT REACHED CENTERLINE	0.680	2.871E-03	0.584	3.220E-03	0.656
T 8406(150)	5.46	5.46	MODEL HAS NOT REACHED CENTERLINE	0.612	2.462E-03	0.501	2.761E-03	0.562
M 8406(150)	5.46	5.46	MODEL HAS NOT REACHED CENTERLINE	0.612	2.462E-03	0.501	2.761E-03	0.562
LS 2417(150)	5.48	5.48	MODEL HAS NOT REACHED CENTERLINE	0.610	2.454E-03	0.500	2.752E-03	0.560
US 8414(150)	5.48	5.48	MODEL HAS NOT REACHED CENTERLINE	0.610	2.454E-03	0.500	2.752E-03	0.560
T 8407(150)	6.53	5.04	MODEL HAS NOT REACHED CENTERLINE	0.365	2.183E-03	0.445	2.449E-03	0.499
M 8407(150)	6.53	5.04	MODEL HAS NOT REACHED CENTERLINE	0.365	2.183E-03	0.445	2.449E-03	0.499
LS 2418(150)	6.56	5.07	MODEL HAS NOT REACHED CENTERLINE	0.364	2.178E-03	0.443	2.443E-03	0.497
US 8415(150)	6.56	5.07	MODEL HAS NOT REACHED CENTERLINE	0.364	2.178E-03	0.443	2.443E-03	0.497
T 8408(150)	7.61	6.12	MODEL HAS NOT REACHED CENTERLINE	0.332	1.982E-03	0.403	2.223E-03	0.452
M 8408(150)	7.61	6.12	MODEL HAS NOT REACHED CENTERLINE	0.332	1.982E-03	0.403	2.223E-03	0.452
LS 2419(150)	7.61	6.12	MODEL HAS NOT REACHED CENTERLINE	0.332	1.982E-03	0.403	2.223E-03	0.452
US 8416(150)	7.61	6.12	MODEL HAS NOT REACHED CENTERLINE	0.332	1.982E-03	0.403	2.223E-03	0.452

240

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## NASA-RI ORBITER PEATING

VA249

AEDC(ARO-INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL R

GROUP	CONFIG	MODEL	MACH NO	PO(PSIA)	TO(DEG R)	ALPHA-MODEL	ALPHA-SECTOR	ALPHA-PREBEND	ROLL-MODEL	YAW
31	1	MATED	8.00	858.6	1359	-4.86	4.86	0	180.00	-0.00
T-INF	P-INF	Q-INF	V-INF	RHO-INF	MU-INF	RE/FT	HREF	STREF		
(DEG R)	(PSIA)	(PSIA)	(FT/SFC)	(SLUGS/FT <sup>3</sup> )	(LR-SEC/FT <sup>2</sup> )	(FT-1)	(R= .0175FI)	(R= .0175FI)		
98.5	.088	3.940	3890	7.929E-05	7.929E-08	3.676E 06	4.913E-02	2.115E-02		
CAMERA	ROLL NO	PAINT TEMP (DEG F)	INITIAL TEMP (DEG F)	SQUARE ROOT (RHOXCK)	TRAR(TO)	BETA(TO)				
TOP(IT)	7855									
UPPER SIDE(US)	8049									
LOWER SIDE(LS)	7637									
MOITCM(R)	7267									

PTC NO	TIME	DELTIME	M(TOI)	M(TOI)/HREF	M(.9TO)	M(.9TO)/HREF	M(.85TO)	M(.85TO)/HREF	ST(TOI)
US 8416(150)	7.63	6.14	1.625E-03	.0331	1.578E-03	.0403	2.218E-03	.0452	6.931E-04
LS 2419(150)	7.63	6.14	1.625E-03	.0331	1.978E-03	.0403	2.218E-03	.0452	6.931E-04
Y 8409(150)	8.68	7.20	1.502E-03	.0306	1.828E-03	.0372	2.050E-03	.0417	6.403E-04
US 8418(150)	8.68	7.20	1.502E-03	.0306	1.828E-03	.0372	2.050E-03	.0417	6.403E-04
US 8417(150)	8.71	7.22	1.499E-03	.0305	1.825E-03	.0371	2.046E-03	.0417	6.393E-04
LS 2420(150)	8.71	7.22	1.499E-03	.0305	1.825E-03	.0371	2.046E-03	.0417	6.393E-04
Y 8410(150)	9.76	8.27	1.401E-03	.0285	1.705E-03	.0347	1.912E-03	.0389	5.972E-04
US 8419(150)	9.76	8.27	1.401E-03	.0285	1.705E-03	.0347	1.912E-03	.0389	5.972E-04
LS 2421(150)	9.76	8.27	1.401E-03	.0285	1.705E-03	.0347	1.912E-03	.0389	5.972E-04
US 8418(150)	9.79	8.30	1.399E-03	.0285	1.702E-03	.0346	1.903E-03	.0389	5.964E-04
Y 8411(150)	10.84	9.35	1.318E-03	.0268	1.604E-03	.0326	1.799E-03	.0366	5.617E-04
US 8419(150)	10.84	9.35	1.318E-03	.0268	1.604E-03	.0326	1.799E-03	.0366	5.617E-04
LS 2422(150)	10.84	9.35	1.318E-03	.0268	1.604E-03	.0326	1.799E-03	.0366	5.617E-04
US 8419(150)	10.86	9.37	1.316E-03	.0268	1.601E-03	.0326	1.796E-03	.0366	5.611E-04
Y 8412(150)	11.51	10.42	1.248E-03	.0254	1.519E-03	.0309	1.703E-03	.0347	5.322E-04
US 8420(150)	11.51	10.42	1.248E-03	.0254	1.519E-03	.0309	1.703E-03	.0347	5.322E-04
LS 2423(150)	11.51	10.42	1.248E-03	.0254	1.519E-03	.0309	1.703E-03	.0347	5.322E-04
US 8420(150)	11.54	10.45	1.246E-03	.0254	1.517E-03	.0309	1.701E-03	.0346	5.317E-04
Y 8413(150)	12.59	11.50	1.188E-03	.0242	1.444E-03	.0294	1.621E-03	.0330	5.065E-04
US 8421(150)	12.59	11.50	1.188E-03	.0242	1.444E-03	.0294	1.621E-03	.0330	5.065E-04
LS 2424(150)	12.59	11.50	1.187E-03	.0242	1.444E-03	.0294	1.620E-03	.0330	5.059E-04
US 8421(150)	13.01	11.53	1.187E-03	.0242	1.444E-03	.0294	1.620E-03	.0330	5.059E-04
Y 8414(150)	14.07	12.58	1.136E-03	.0231	1.383E-03	.0281	1.551E-03	.0316	4.845E-04
US 8422(150)	14.07	12.58	1.136E-03	.0231	1.383E-03	.0281	1.551E-03	.0316	4.845E-04
LS 2425(150)	14.07	12.58	1.136E-03	.0231	1.383E-03	.0281	1.551E-03	.0316	4.845E-04

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 6/29/73

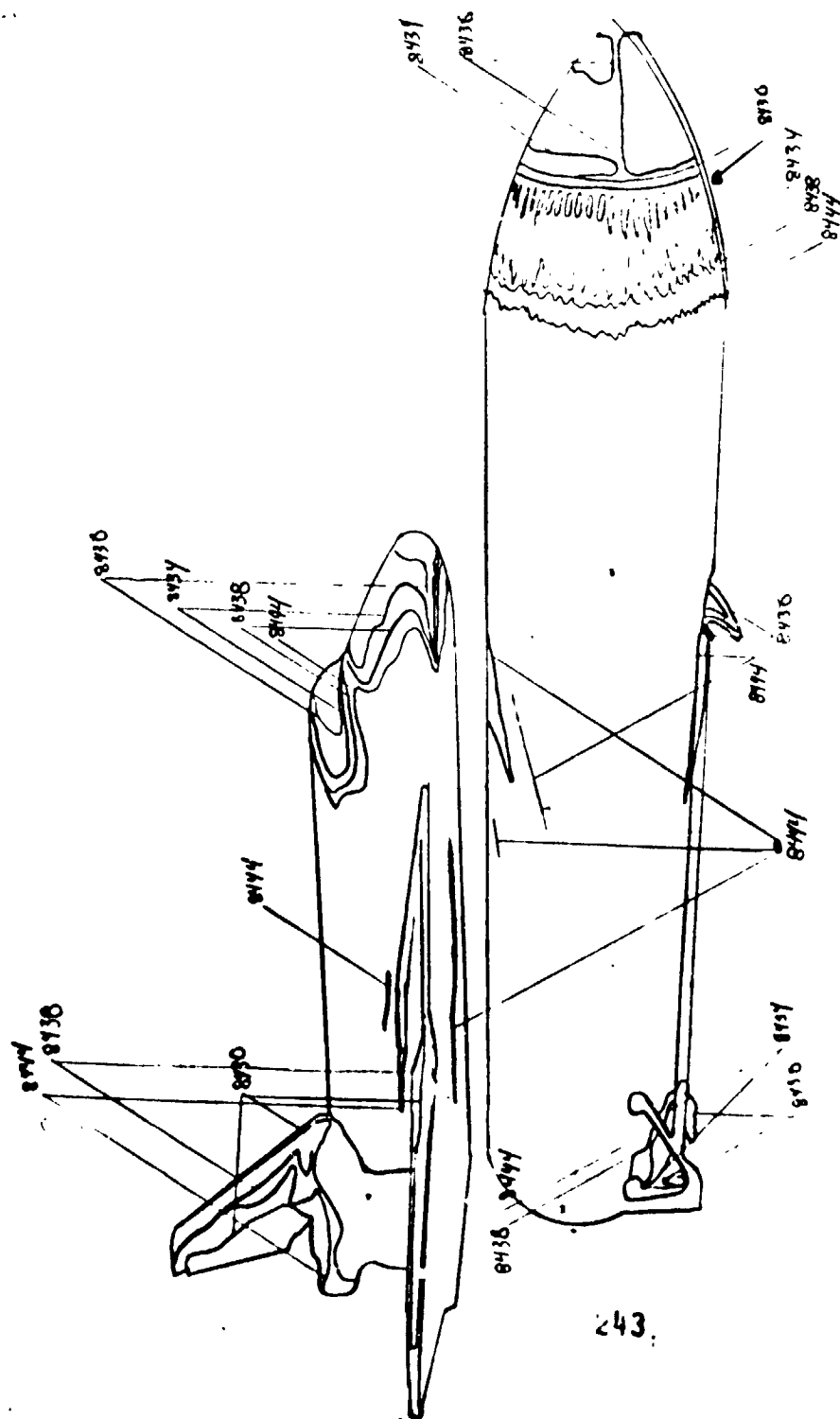
AEDCIAR(IAC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL B

NASA-RI ORBITER HEATING  
 VA289

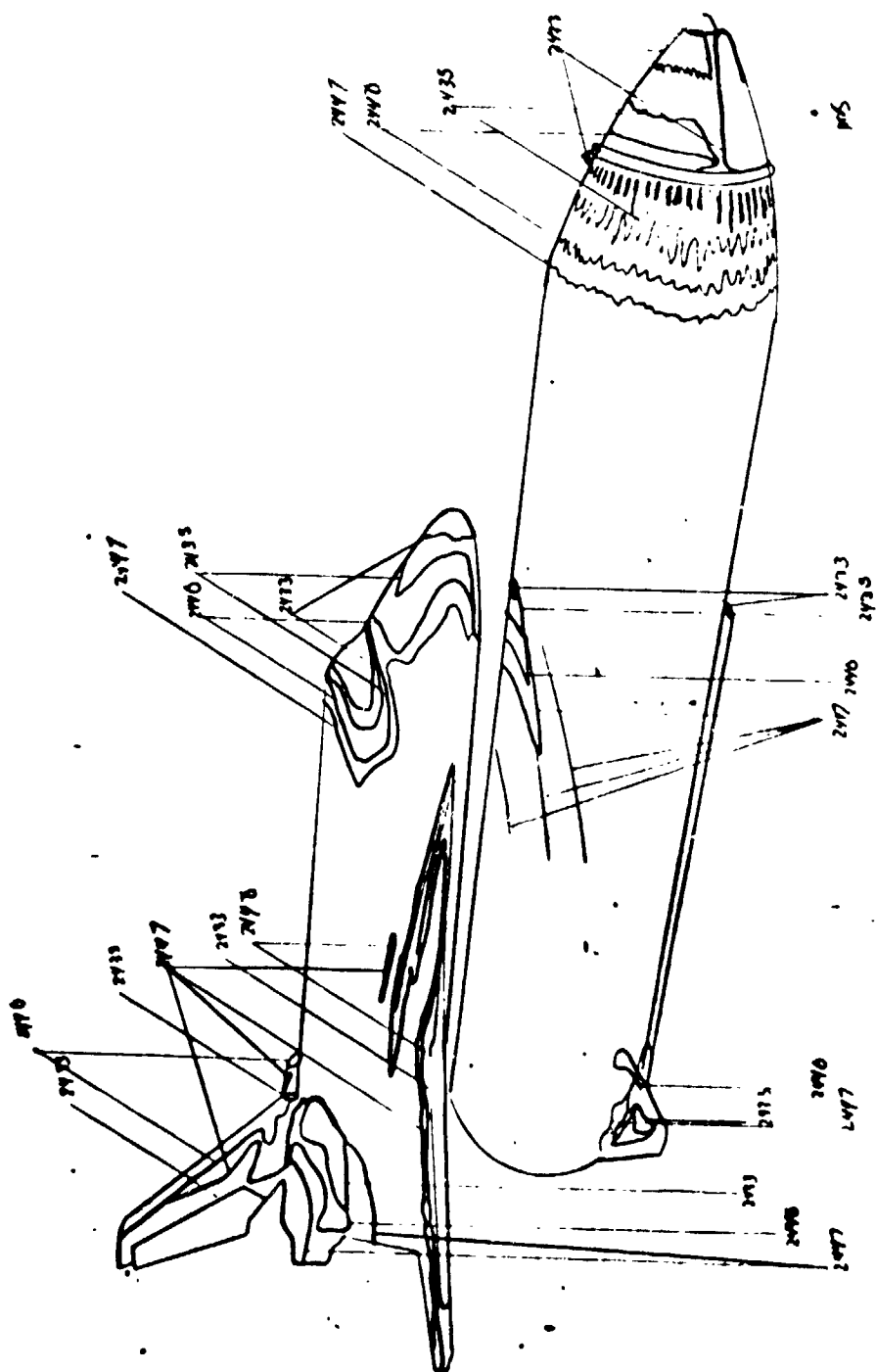
GROUP CNFIG MODEL MACH NO POIPSTIA TO(DEG P) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREBEND ROLL-MODEL YAW  
 31 1 8.00 858.3 1359 -4.86 4.86 0 180.00 -0.00  
 T-INF P-INF Q-INF V-INF MU-INF RE/FT MREF STREF  
 (DEG R) (PSIA) (FT/SEC) (SLUGS/FT<sup>3</sup>) (LB-SEC/FT<sup>2</sup>) (FT-1) (R=.0175FT) (R=.0175FT)  
 98.5 .088 3.939 3890 7.491E-05 7.927E-08 3.676E 06 4.912E-02 2.116E-02  
 CAMERA ROLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHOXCXK) TBAR(TO) BETA(TO)  
 TOP(T) 7855  
 UPPER SINE(US) 8049  
 LOWER SINE(LS) 7637  
 BOTTOM(M) 7267

PIC NO TIME DELTIME H(TO) H(TO)/HREF H(.970) H(.970)/HREF H(.85TO) H(.85TO)/HREF ST(TO)  
 US 8422(150) 14.09 12.64 1.135E-03 .0231 1.381E-03 .0291 1.549E-03 .0315 4.840E-04  
 T 8415(150) 15.14 13.65 1.090E-03 .0222 1.327E-03 .0270 1.488E-03 .0303 4.649E-04  
 LS 4195(150) 15.14 13.65 1.090E-03 .0222 1.327E-03 .0270 1.488E-03 .0303 4.649E-04  
 US 8423(150) 15.17 13.68 1.090E-03 .0222 1.327E-03 .0270 1.488E-03 .0303 4.649E-04  
 T 8416(150) 16.22 14.73 1.050E-03 .0214 1.278E-03 .0260 1.433E-03 .0292 4.478E-04  
 M 8415(150) 16.22 14.73 1.050E-03 .0214 1.278E-03 .0260 1.433E-03 .0292 4.478E-04  
 LS 2427(150) 16.22 14.73 1.050E-03 .0214 1.278E-03 .0260 1.433E-03 .0292 4.478E-04  
 US 8424(150) 16.24 14.75 1.049E-03 .0214 1.278E-03 .0260 1.433E-03 .0292 4.478E-04  
 T 8417(150) 17.29 15.81 1.013E-03 .0206 1.233E-03 .0251 1.383E-03 .0282 4.321E-04  
 M 8417(150) 17.29 15.81 1.013E-03 .0206 1.233E-03 .0251 1.383E-03 .0282 4.321E-04  
 LS 2428(150) 17.29 15.81 1.013E-03 .0206 1.233E-03 .0251 1.383E-03 .0282 4.321E-04  
 US 8425(150) 17.32 15.83 1.013E-03 .0206 1.233E-03 .0251 1.383E-03 .0282 4.321E-04  
 T 8418(150) 18.37 16.88 9.805E-04 .0200 1.193E-03 .0243 1.338E-03 .0272 4.181E-04  
 M 8426(150) 18.37 16.88 9.805E-04 .0200 1.193E-03 .0243 1.338E-03 .0272 4.181E-04  
 LS 2429(150) 18.37 16.88 9.805E-04 .0200 1.193E-03 .0243 1.338E-03 .0272 4.181E-04  
 MODEL HAS LEFT CENTERLINE  
 T 8419(150) 19.42 17.93 9.514E-04 .0194 1.157E-03 .0236 1.299E-03 .0264 4.057E-04  
 M 8419(150) 19.42 17.93 9.514E-04 .0194 1.157E-03 .0236 1.299E-03 .0264 4.057E-04  
 LS 2430(150) 19.45 17.96 9.507E-04 .0194 1.157E-03 .0235 1.298E-03 .0264 4.053E-04

8049  
6137  
Up 11.5.88

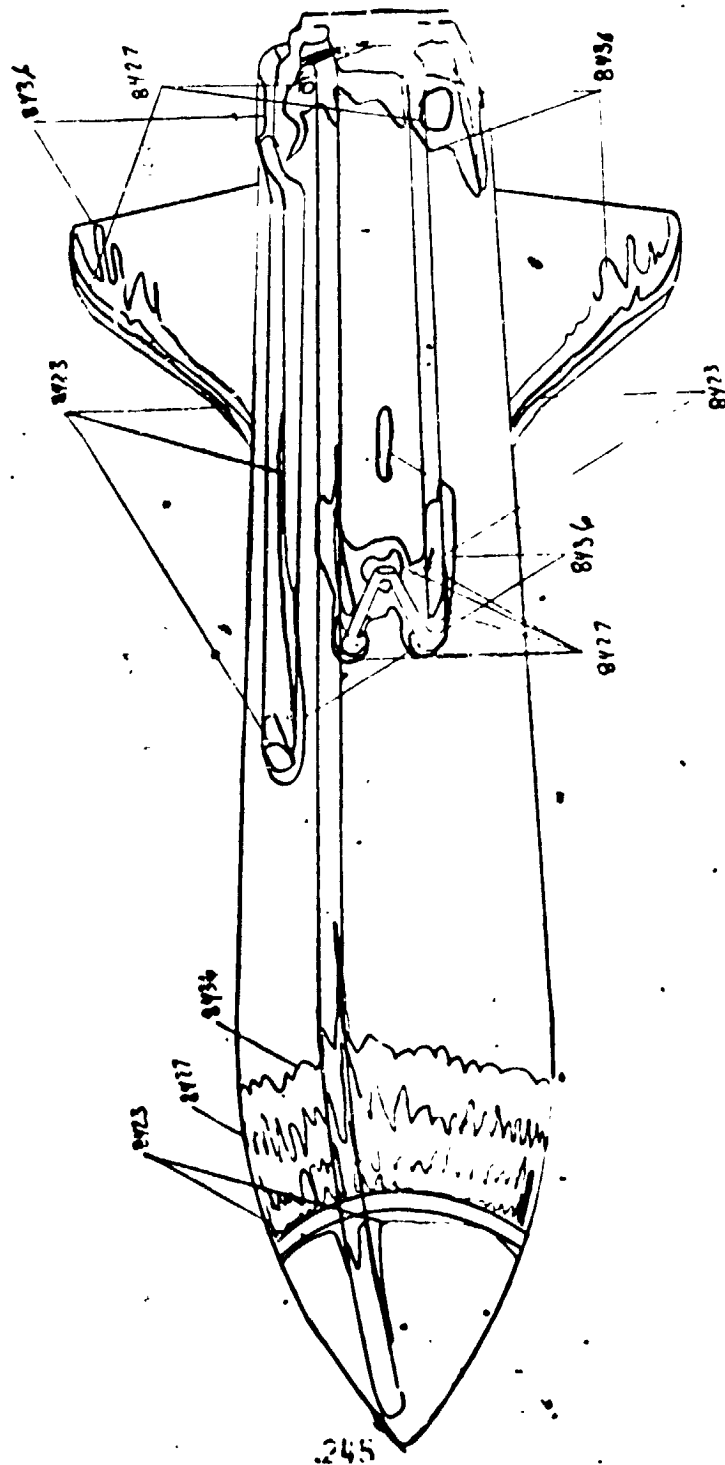






2448

Group 32  
7855  
Top  
ND





AEOCI(ARO, INC.) ARNOLD AFS, TENNESSEE  
VON KARMAN GAS DYNAMICS FACILITY  
50 INCH HYPERSONIC TUNNEL A

**WAS-PI COMPUTER READING**

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6/29/73

MASART ORBITER HEATING

VA299

AEDC(ARO-INC.) ARNOLD AFS, TENNESSEE  
VON KARMAN GAS DYNAMICS FACILITY  
50 INCH HYPERSONIC TUNNEL B

GROUP CONFIG MODEL MACH NO PO(PSIA) TO( DEG R) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREREND ROLL-MODEL YAW  
32 1 MATED 8.00 860.8 1360 .15 .15 0 180.00 .00

T-INF P-INF Q-INF V-INF RHO-INF MU-INF RE/FT MREF STREF  
(DEG R) (PSIA) (PSIA) (FT/SFC) (SLUGS/FT3) (LB-SEC/FT2) (FT-1) (RZ .0175FT) (RZ .0175FT)  
9.5 .088 3.950 3891 7.507E-05 7.934E-08 3.682E 06 4.919E-02 2.114E-02

CAMEPA ROLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHOXCKK) TBRAR(TO) BETA(TO)  
TOP(T) 7555  
UPPER SIDE(US) 8049  
LOWER SIDE(LS) 7637  
MOTION(B) 7267

2.073E-01 2.2056E-01

PIC NO TIME DELTIME H(TO) H(TO)/HREF H(9TO) H(9TO)/HREF H(85TO) H(85TO)/HREF ST(TO)

T R427(250) 8.61 7.11 4.426E-03 .0900 5.536E-03 .1125 6.332E-03 .1287 1.072E-03

US R435(250) 8.61 7.11 4.426E-03 .0900 5.536E-03 .1125 6.332E-03 .1287 1.072E-03

LS R436(250) 8.61 7.11 4.426E-03 .0900 5.536E-03 .1125 6.332E-03 .1287 1.072E-03

T R428(250) 8.61 8.18 4.125E-03 .0834 5.159E-03 .1048 5.900E-03 .1199 1.744E-03

US R436(250) 9.69 8.18 4.125E-03 .0834 5.159E-03 .1048 5.900E-03 .1199 1.744E-03

M R436(250) 9.69 8.18 4.125E-03 .0834 5.159E-03 .1048 5.900E-03 .1199 1.744E-03

LS R439(250) 9.69 8.18 4.125E-03 .0834 5.159E-03 .1048 5.900E-03 .1199 1.744E-03

R R439(250) 10.74 9.23 3.883E-03 .0788 4.856E-03 .0887 5.554E-03 .1129 1.640E-03

T R429(250) 10.74 9.23 3.883E-03 .0788 4.856E-03 .0887 5.554E-03 .1129 1.640E-03

US R437(250) 10.76 9.26 3.878E-03 .0788 4.850E-03 .0886 5.547E-03 .1127 1.640E-03

LS R440(250) 10.76 9.26 3.878E-03 .0788 4.850E-03 .0886 5.547E-03 .1127 1.640E-03

M R430(250) 11.81 10.31 3.675E-03 .0747 4.596E-03 .0834 5.257E-03 .1067 1.552E-03

T R430(250) 11.84 10.34 3.670E-03 .0746 4.590E-03 .0833 5.250E-03 .1067 1.552E-03

US R434(250) 11.84 10.34 3.670E-03 .0746 4.590E-03 .0833 5.250E-03 .1067 1.552E-03

LS R441(250) 11.84 10.34 3.670E-03 .0746 4.590E-03 .0833 5.250E-03 .1067 1.552E-03

T R431(250) 12.69 11.39 3.447E-03 .0711 4.373E-03 .0849 5.002E-03 .1017 1.479E-03

M R431(250) 12.69 11.39 3.447E-03 .0711 4.373E-03 .0849 5.002E-03 .1017 1.479E-03

US R439(250) 12.91 11.41 3.443E-03 .0710 4.368E-03 .0849 5.002E-03 .1015 1.479E-03

LS R442(250) 12.91 11.41 3.443E-03 .0710 4.368E-03 .0849 5.002E-03 .1015 1.479E-03

T R432(250) 13.97 12.46 3.342E-03 .0679 4.180E-03 .0849 4.781E-03 .0971 1.413E-03

M R432(250) 13.97 12.46 3.342E-03 .0679 4.180E-03 .0849 4.781E-03 .0971 1.413E-03

US R440(250) 13.99 12.49 3.339E-03 .0679 4.176E-03 .0849 4.776E-03 .0971 1.412E-03

LS R441(250) 13.99 12.49 3.339E-03 .0679 4.176E-03 .0849 4.776E-03 .0971 1.412E-03

T R433(250) 15.04 13.54 3.207E-03 .0652 4.011E-03 .0815 4.587E-03 .0932 1.356E-03

M R433(250) 15.04 13.54 3.207E-03 .0652 4.011E-03 .0815 4.587E-03 .0932 1.356E-03

144

148

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 6/29/73

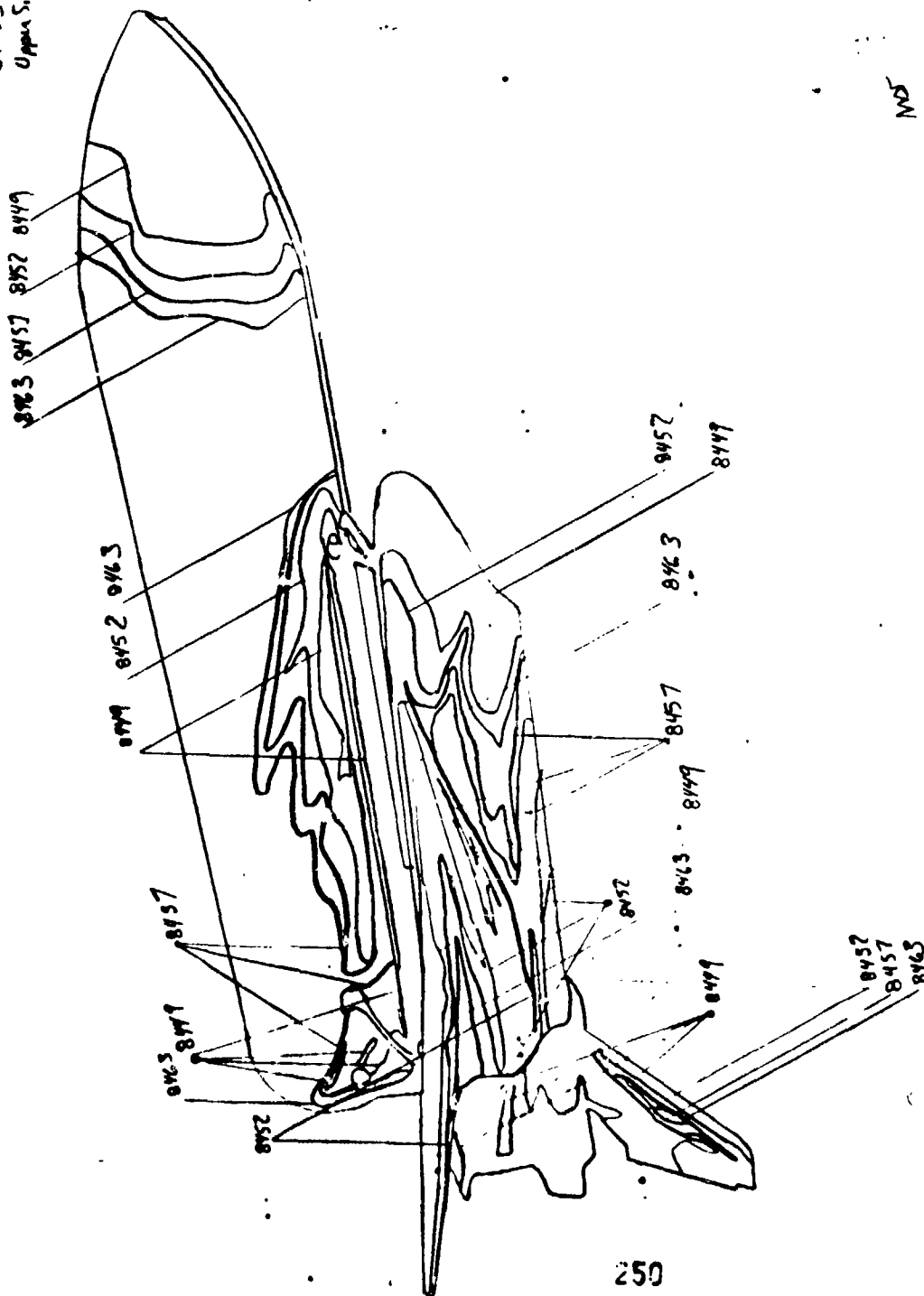
NASA-PI ORBITER PEATING  
 VA289

AEDC(ARO, INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL R

GROUP CONFIG MODEL MACH NO PO(PSIA) TO(DEG R) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREBEND ROLL-MODEL YAW  
 32 1 MATED 8.00 861.6 1360 .15 -.15 0 180.00 .00  
 T-INF P-INF Q-INF V-INF MU-INF RE/FT HREF STREF  
 IDEG R (PSIA) (FT/SEC) (SLUGS/FT3) (LPS-SEC/FT2) (FT-1) (R=.0175FT) (R=.0175FT)  
 9A.5 .088 3.954 3891 7.514E-05 7.933E-08 3.686E 06 4.922E-02 2.113E-02  
 CAMERA ROLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHOXCKX) TBAR(TO) BEYA(TO)  
 TOP(T) 7855  
 UPPER SINE(US) 8049  
 LOWER SINE(US) 7637  
 MOTION(18) 7267  
 .0535 2.073E-01 2.2056E-01

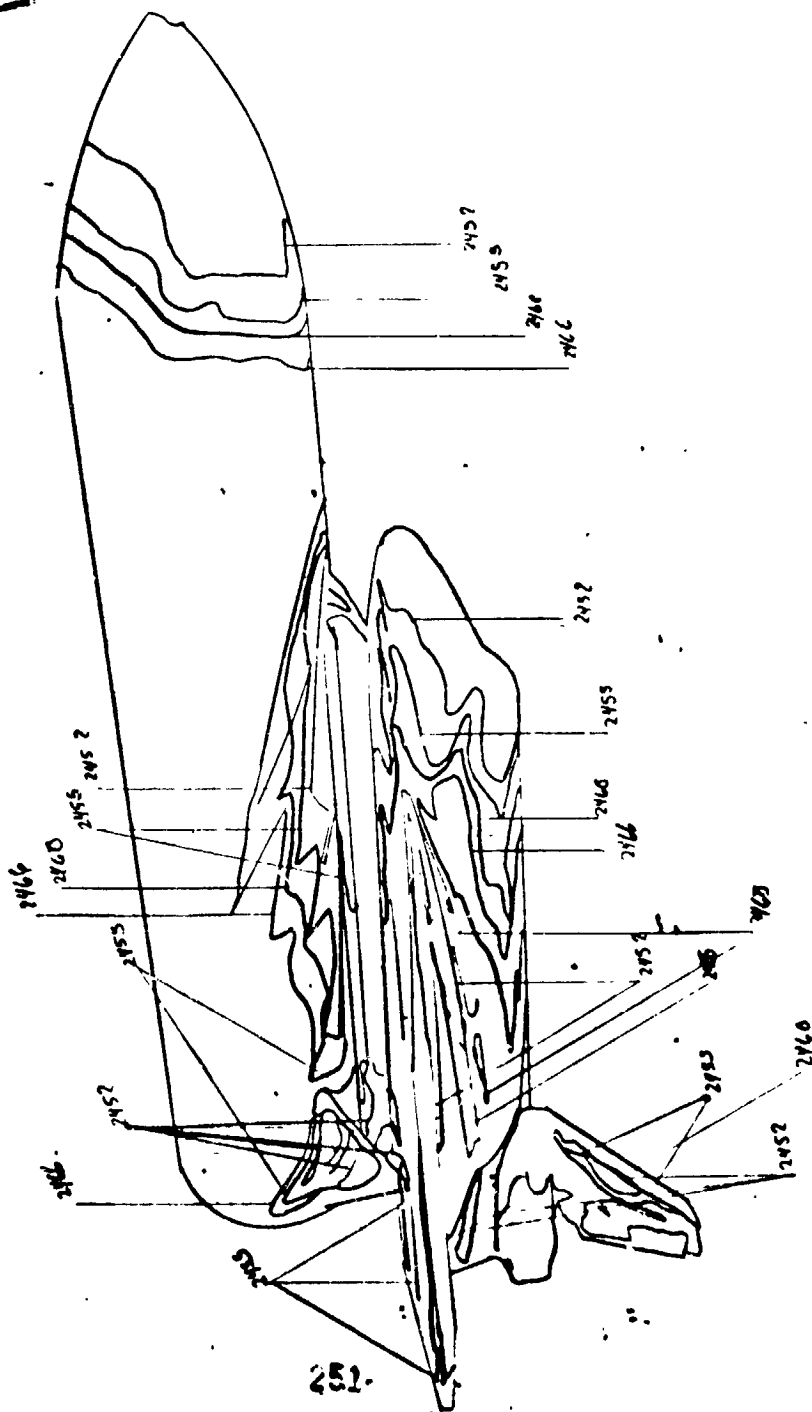
PIC NO	TIME DELTIME	H(TO)	HREF	H(.9TO)	HREF	H(.95TO)	HREF	H(.85TO)	HREF	ST(TO)
US 8441(250)	15.07	3.204E-03	.0651	4.007E-03	.0814	4.583E-03	.0931	4.583E-03	.0931	1.354E-03
LS 2444(250)	15.07	3.204E-03	.0651	4.007E-03	.0814	4.583E-03	.0931	4.583E-03	.0931	1.354E-03
T 8434(250)	16.12	3.087E-03	.0627	3.860E-03	.0794	4.415E-03	.0897	4.415E-03	.0897	1.305E-03
H 4214(250)	16.12	3.047E-03	.0627	3.860E-03	.0794	4.415E-03	.0897	4.415E-03	.0897	1.305E-03
US 8442(250)	16.14	3.044E-03	.0627	3.857E-03	.0784	4.411E-03	.0896	4.411E-03	.0896	1.304E-03
LS 2445(250)	16.14	3.044E-03	.0627	3.857E-03	.0784	4.411E-03	.0896	4.411E-03	.0896	1.304E-03
T 8435(250)	17.19	2.979E-03	.0605	3.725E-03	.0757	4.261E-03	.0866	4.261E-03	.0866	1.260E-03
H 4215(250)	17.19	2.979E-03	.0605	3.725E-03	.0757	4.261E-03	.0866	4.261E-03	.0866	1.260E-03
US 8443(250)	17.22	2.976E-03	.0605	3.722E-03	.0757	4.258E-03	.0865	4.258E-03	.0865	1.259E-03
LS 2446(250)	17.22	2.976E-03	.0605	3.722E-03	.0757	4.258E-03	.0865	4.258E-03	.0865	1.259E-03
T 8436(250)	18.27	2.842E-03	.0586	3.604E-03	.0732	4.122E-03	.0838	4.122E-03	.0838	1.218E-03
H 4216(250)	18.27	2.842E-03	.0586	3.604E-03	.0732	4.122E-03	.0838	4.122E-03	.0838	1.218E-03
LS 2447(250)	18.27	2.842E-03	.0586	3.604E-03	.0732	4.122E-03	.0838	4.122E-03	.0838	1.218E-03
US 8444(250)	18.70	2.879E-03	.0585	3.601E-03	.0732	4.119E-03	.0837	4.119E-03	.0837	1.218E-03
MODEL HAS LEFT CENTERLINE										
T 8437(250)	18.70	2.713E-03	.0561	3.493E-03	.0710	3.996E-03	.0812	3.996E-03	.0812	1.181E-03
H 4217(250)	18.70	2.713E-03	.0561	3.493E-03	.0710	3.996E-03	.0812	3.996E-03	.0812	1.181E-03
LS 2448(250)	19.35	2.793E-03	.0568	3.493E-03	.0710	3.996E-03	.0812	3.996E-03	.0812	1.181E-03
US 8445(250)	19.37	2.791E-03	.0567	3.491E-03	.0709	3.993E-03	.0811	3.993E-03	.0811	1.180E-03
T 8438(250)	2.42	2.713E-03	.0551	3.493E-03	.0689	3.880E-03	.0788	3.880E-03	.0788	1.147E-03
H 4218(250)	20.42	2.713E-03	.0551	3.493E-03	.0689	3.880E-03	.0788	3.880E-03	.0788	1.147E-03
LS 2449(250)	20.42	2.713E-03	.0551	3.493E-03	.0689	3.880E-03	.0788	3.880E-03	.0788	1.147E-03
US 8446(250)	20.45	2.711E-03	.0551	3.490E-03	.0689	3.878E-03	.0788	3.878E-03	.0788	1.146E-03

8049  
GP 33  
Upper Side

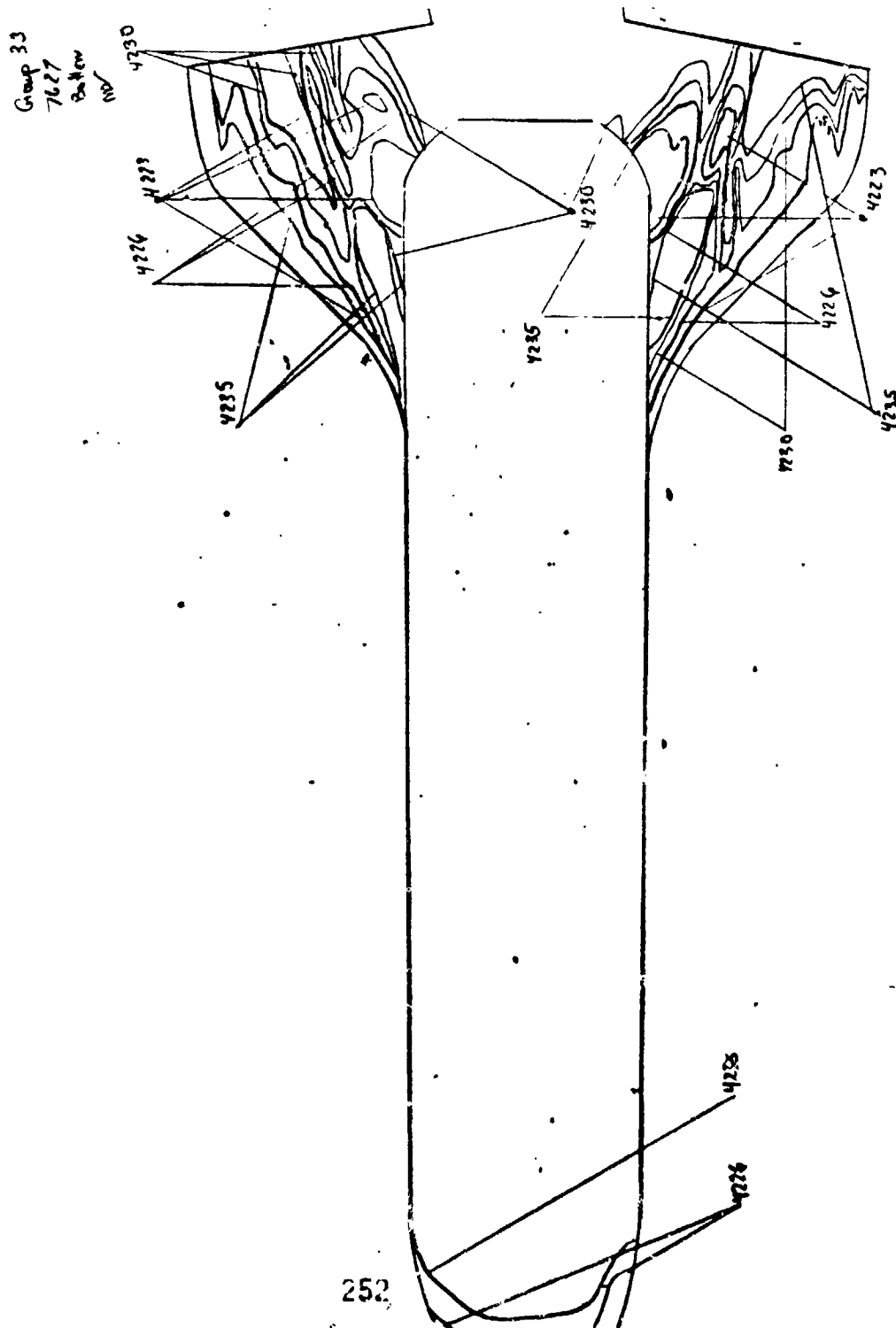


MS

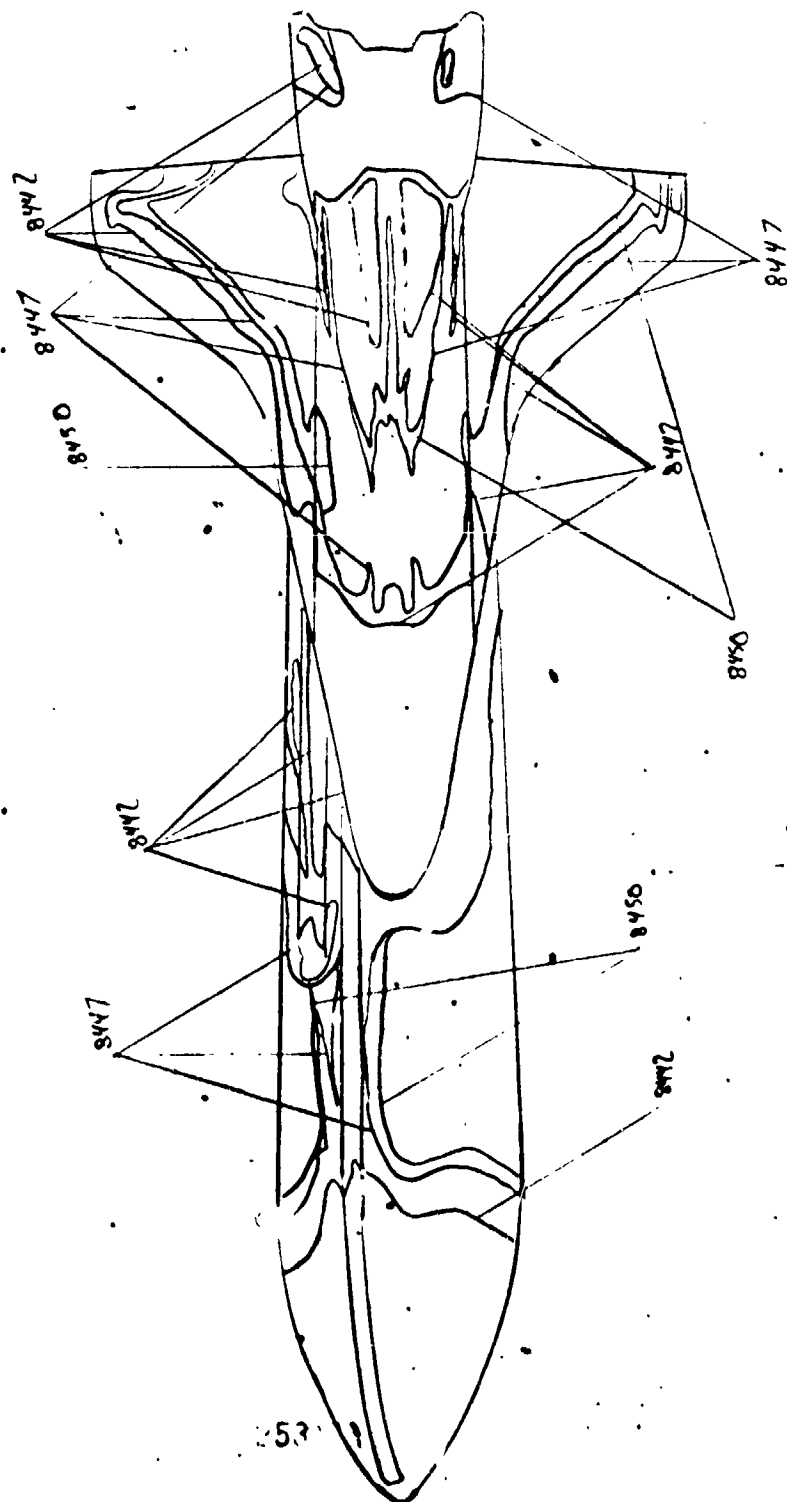
7637  
G.P. 33  
Lower Side







Group 33  
Top  
7855  
NO



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6/30/73

NASA-41 ORBITER HEATING

VAZ89

AFDC(IAND, INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL H

GROUP CONFID MACH NO P0(P5IA) TO(DEC R) ALPHA-MODEL ALPHA-SECTION ALPHA-PREBEND ROLL-MODEL YAW  
 37 1 P.00 860.2 1358 -5.15 -5.15 0 0 0

T-TAF P-1-IF 0-1-IF V-1-IF MU-INF MU-1-IF HF/FT HREF STREF  
 (DEG R) (PSIA) (FT/SEC) (SLUGS/FT3) (LBS-SEC/FT2) (FT-1) (P= .0175FT) (H= .0175FT)  
 94.4 .088 3.947 388 7.514E-05 7.521E-08 3.488E 06 9.916E-02 2.112E-02

CAMERA HOLL NO PAINT IFMP (DFG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHOACR) TRAR(TO) BETAITO)

TOP(T) 7855  
 UPPER SIDE(US) 8049  
 LOWER SIDE(LS) 7837  
 HOT(T) 7267

R0 .0494

0

0

PIC NO TIME DELTIME H(TO)/HREF H(-910) H(-867TO) H(-867TO)/HREF ST(TO)

T 8439(150) 1.15 MODEL HAS NOT REACHED CENTERLINE

H 4219(150) 1.15 MODEL HAS NOT REACHED CENTERLINE

LS 2450(150) 1.15 MODEL HAS NOT REACHED CENTERLINE

US 4447(150) 1.15 MODEL HAS NOT REACHED CENTERLINE

T 8449(150) 2.23 MODEL HAS NOT REACHED CENTERLINE

H 4220(150) 2.23 MODEL HAS NOT REACHED CENTERLINE

LS 8444(150) 2.25 MODEL HAS NOT REACHED CENTERLINE

US 2451(150) 2.25 MODEL HAS NOT REACHED CENTERLINE

145

T 8441(150) 3.20 1.84 3.009E-03 .0612 3.460E-03 .0745 3.944E-03 .0802 1.280E-03

H 4221(150) 3.20 1.84 3.009E-03 .0612 3.460E-03 .0745 3.944E-03 .0802 1.280E-03

LS 2452(150) 3.23 1.84 3.009E-03 .0604 3.435E-03 .0740 3.917E-03 .0797 1.272E-03

US 4449(150) 3.23 1.84 3.009E-03 .0604 3.435E-03 .0740 3.917E-03 .0797 1.272E-03

T 8452(150) 4.34 2.84 2.340E-03 .1484 2.494E-03 .0589 3.120E-03 .0635 1.014E-03

H 4222(150) 4.34 2.84 2.340E-03 .1484 2.494E-03 .0589 3.120E-03 .0635 1.014E-03

LS 2453(150) 4.34 2.84 2.340E-03 .1484 2.494E-03 .0589 3.120E-03 .0635 1.014E-03

US 4451(150) 4.34 2.84 2.340E-03 .1484 2.494E-03 .0589 3.120E-03 .0635 1.014E-03

T 8453(150) 5.46 3.94 2.401E-03 .1413 2.470E-03 .0503 2.662E-03 .0541 8.642E-04

H 4223(150) 5.46 3.94 2.401E-03 .1413 2.470E-03 .0503 2.662E-03 .0541 8.642E-04

LS 2454(150) 5.46 3.94 2.401E-03 .1413 2.470E-03 .0503 2.662E-03 .0541 8.642E-04

US 4451(150) 5.46 3.94 2.401E-03 .1413 2.470E-03 .0503 2.662E-03 .0541 8.642E-04

T 8451(150) 5.48 3.94 2.401E-03 .1413 2.470E-03 .0503 2.662E-03 .0541 8.642E-04

H 4444(150) 6.53 5.03 1.800E-03 .0366 2.190E-03 .0466 2.360E-03 .0480 7.662E-04

LS 4224(150) 6.53 5.03 1.800E-03 .0366 2.190E-03 .0466 2.360E-03 .0480 7.662E-04

US 2455(150) 6.53 5.03 1.800E-03 .0366 2.190E-03 .0466 2.360E-03 .0480 7.662E-04

T 8452(150) 6.56 5.03 1.746E-03 .0365 2.144E-03 .0444 2.334E-03 .0479 7.642E-04

H 4451(150) 7.61 6.11 1.634E-03 .0332 1.984E-03 .0404 2.142E-03 .0436 6.955E-04

LS 2456(150) 7.61 6.11 1.634E-03 .0332 1.984E-03 .0404 2.142E-03 .0436 6.955E-04

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6/30/73

AFDC(ARO, INC.) ARNOLD AFS, TENNESSEE  
VON KARMAN GAS DYNAMICS FACILITY  
50 INCH HYPERSONIC TUNNEL R

NASA-RI ORBITER HEATING

VA289

GROUP CONFIG MODEL MACH NO PO(PST) TO(DEG H) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREBEND ROLL-MODEL YAW 0

31 1 1358 460.1 -5.15 -5.15 0 0 0

T-INF P-INF Q-INF V-INF MU-INF MU-INF HREF STREF

(DEG H) (PSIA) (FT/SEC) (SLUGS/FT<sup>3</sup>) (LB-SEC/FT<sup>2</sup>) (FT-L) (R=0.175EI)

94.4 3.647 3888 7.513E-05 7.521E-08 2.488E 06 4.916E-02 2.112E-02

CAMERA ROLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHOACXK) TBAH(TO) BETA(TO)

IGP(T) 7655

UPPER SINE(US) 8049

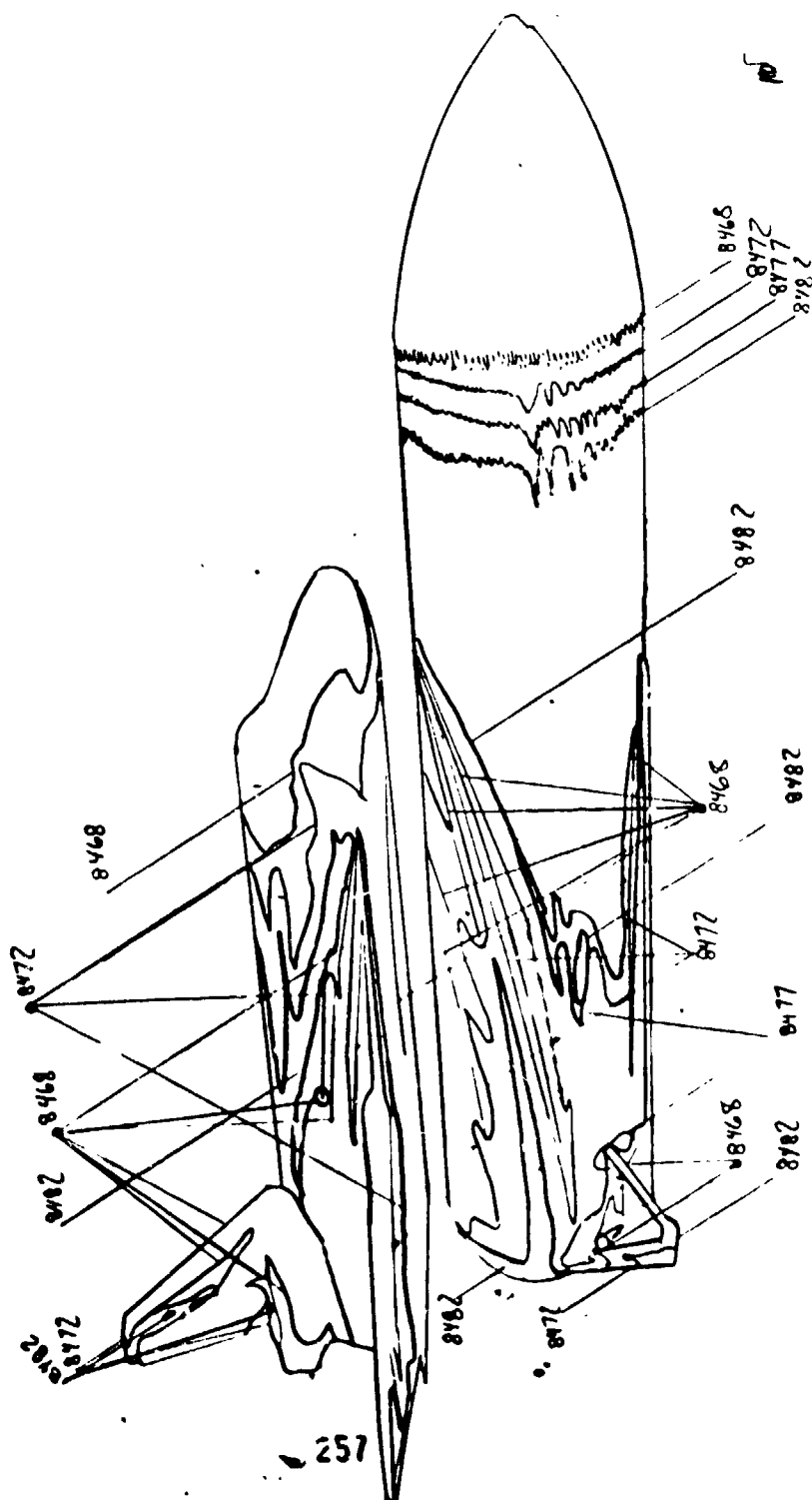
LOWER SINE(LS) 7637

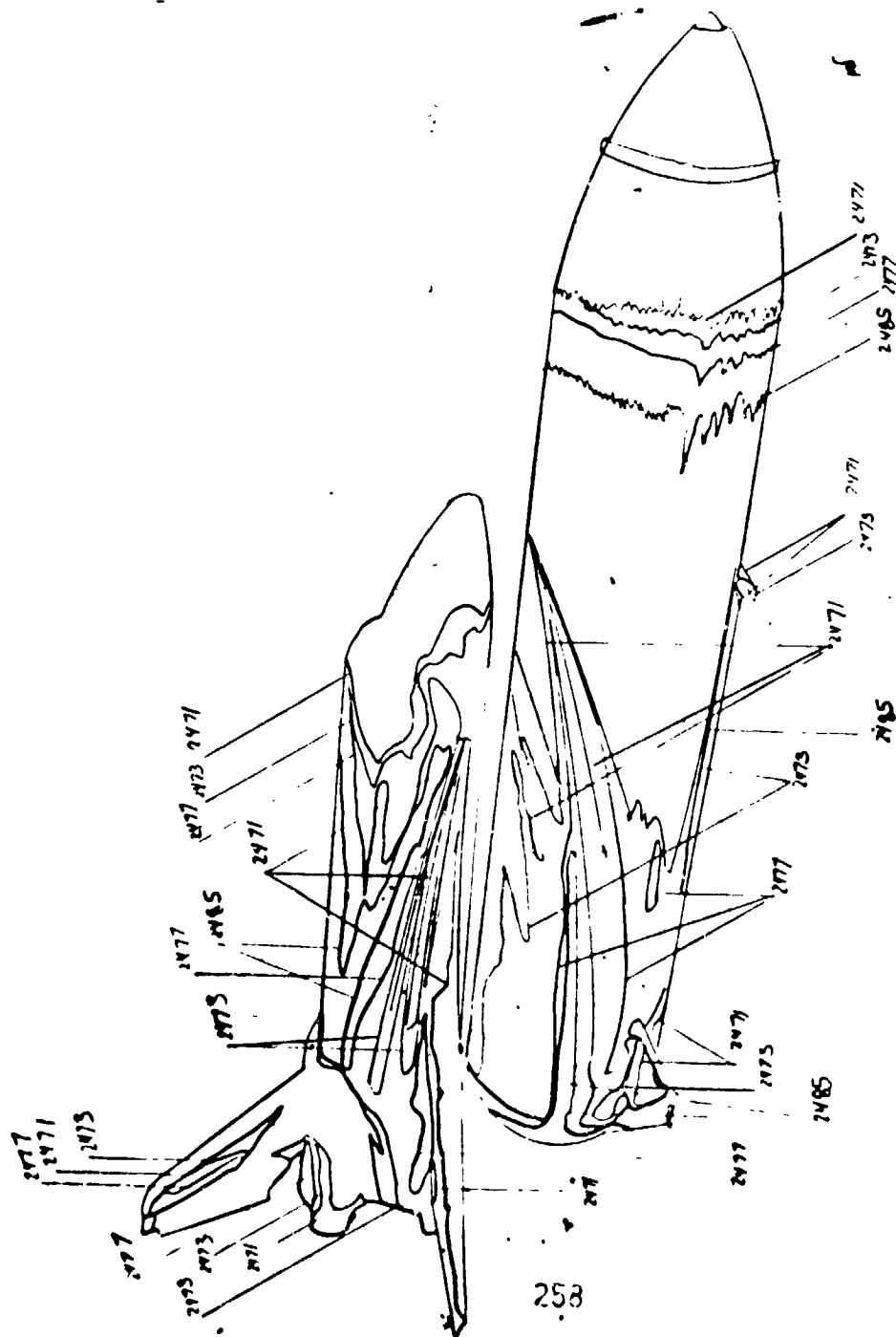
MOTOM(B) 7267

PIC N	TIME	MELTIME	M(TO)	M(TO)/HREF	M(910)	M(910)/HREF	M(910)/HREF	M(910)/HREF	ST(TO)
T 4452(150)	15.09	13.59	1.045E-03	.0223	1.332E-03	.0271	1.436E-03	.0292	4.662E-04
M 4232(150)	15.09	13.59	1.045E-03	.0223	1.332E-03	.0271	1.436E-03	.0292	4.662E-04
LS 2463(150)	15.09	13.59	1.045E-03	.0223	1.332E-03	.0271	1.436E-03	.0292	4.662E-04
US 4460(150)	15.12	13.61	1.044E-03	.0223	1.331E-03	.0271	1.434E-03	.0292	4.658E-04
T 4453(150)	16.17	14.67	1.044E-03	.0214	1.283E-03	.0261	1.382E-03	.0281	4.486E-04
M 4233(150)	16.17	14.67	1.044E-03	.0214	1.283E-03	.0261	1.382E-03	.0281	4.486E-04
LS 2464(150)	16.17	14.67	1.044E-03	.0214	1.283E-03	.0261	1.382E-03	.0281	4.486E-04
US 4461(150)	16.19	14.69	1.043E-03	.0214	1.281E-03	.0261	1.381E-03	.0281	4.482E-04
T 4454(150)	17.24	15.74	1.018E-03	.0207	1.234E-03	.0252	1.334E-03	.0271	4.330E-04
M 4234(150)	17.24	15.74	1.018E-03	.0207	1.234E-03	.0252	1.334E-03	.0271	4.330E-04
LS 2465(150)	17.24	15.74	1.018E-03	.0207	1.234E-03	.0252	1.334E-03	.0271	4.330E-04
US 4462(150)	17.27	15.77	1.017E-03	.0207	1.231E-03	.0252	1.331E-03	.0271	4.327E-04
T 4455(150)	18.22	16.72	9.845E-04	.0200	1.194E-03	.0244	1.294E-03	.0263	4.193E-04
M 4235(150)	18.22	16.72	9.845E-04	.0200	1.194E-03	.0244	1.294E-03	.0263	4.193E-04
LS 2466(150)	18.22	16.72	9.845E-04	.0200	1.194E-03	.0244	1.294E-03	.0263	4.193E-04
US 4463(150)	18.25	16.75	9.845E-04	.0200	1.192E-03	.0244	1.292E-03	.0262	4.189E-04
MODEL HAS LEFT CENTERLINE									
T 4454(150)	19.20	17.69	9.544E-04	.0194	1.161E-03	.0236	1.251E-03	.0254	4.061E-04
M 4236(150)	19.20	17.69	9.544E-04	.0194	1.161E-03	.0236	1.251E-03	.0254	4.061E-04
LS 2467(150)	19.20	17.69	9.544E-04	.0194	1.161E-03	.0236	1.251E-03	.0254	4.061E-04
US 4464(150)	19.22	17.72	9.527E-04	.0194	1.161E-03	.0236	1.250E-03	.0254	4.059E-04
T 4457(150)	20.47	18.97	9.249E-04	.0189	1.124E-03	.0229	1.215E-03	.0247	3.946E-04
M 4237(150)	20.47	18.97	9.249E-04	.0189	1.124E-03	.0229	1.215E-03	.0247	3.946E-04
LS 2468(150)	20.47	18.97	9.249E-04	.0189	1.124E-03	.0229	1.215E-03	.0247	3.946E-04
US 4465(150)	20.50	19.00	9.243E-04	.0189	1.122E-03	.0229	1.214E-03	.0247	3.942E-04

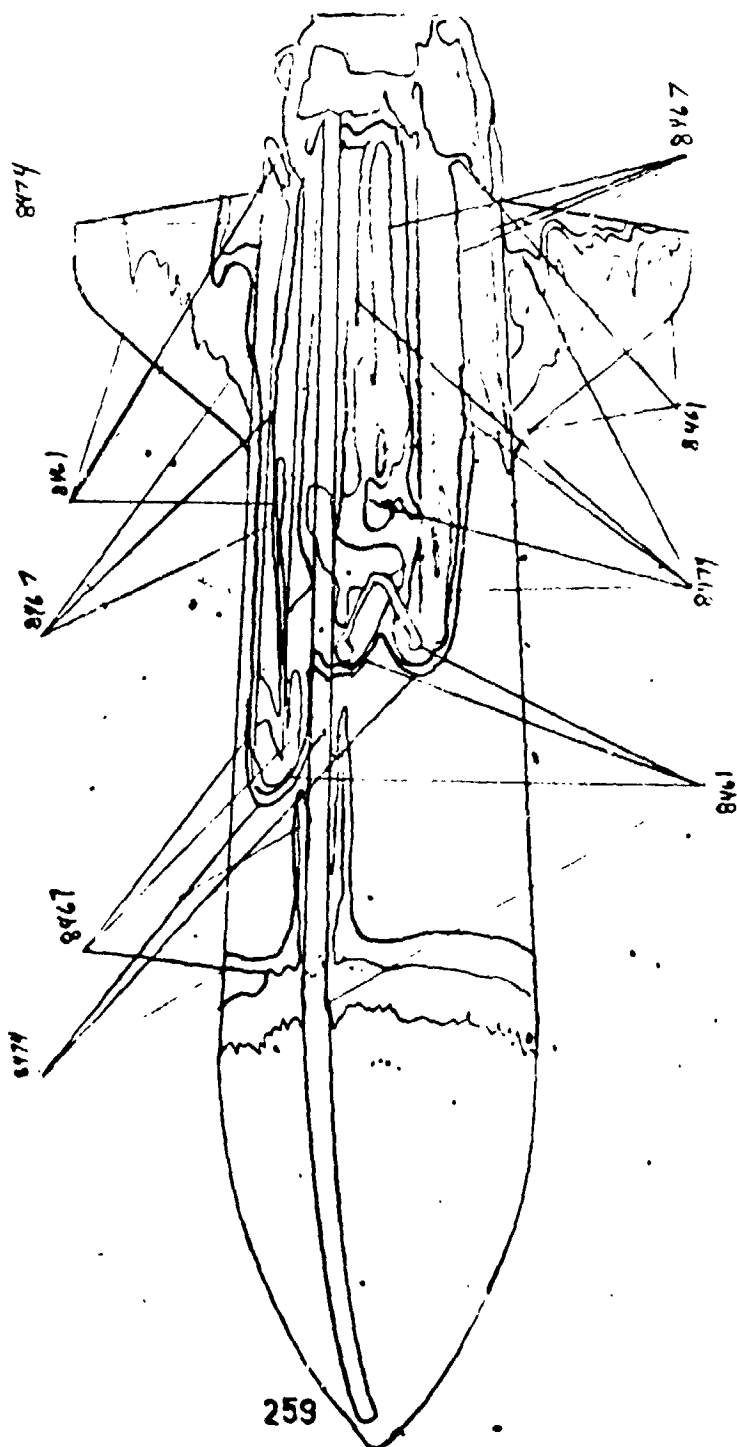
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UNCLASSIFIED  
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Group 34  
7855  
Top  
Mid







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 UNCLASSIFIED  
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 6/29/73

NASA-RI ORBITER PLATING

AECIARDIAC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL W

VA289

GROUP CONFIG MODEL MACH NO PO(PSIA) TO(DEG R) ALPHA-M EL ALPHA-SECTOR ALPHA-PREBEND ROLL-MODEL YAW  
 34 1 0.00 058.5 1350 .12 .12 0 100.00 .00

T-INF P-INF Q-INF RMO-INF MU-INF HREF STREF  
 (CG R) (PSIA) (FT/SEC) (SLUGS/FT<sup>3</sup>) (LB-SEC/FT<sup>2</sup>) (FT-1) (H= .0175FT) (R= .0175FT)  
 9P.4 .082 3.939 2984 7.408E-05 7.922E-04 3.680E 06 4.912E-02 2.114E-02

CAMERA ROLL NO PAINT IFMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHO/CXK) TBAR(10) BETA(10)

TOP(1) 7855 0.0466 0 0

UPPER SINE(US) 8049

LOWER SINE(LS) 7637

MOTIONCH) 7267

PIC NO TIME RELTIME HITO: HITO/HREF H(10STO) H(10STO)/HREF ST(10)

T 4654(131) 1.15 MODEL WAS NOT REACHED CENTERLINE  
 US 4654(131) 1.15 MODEL WAS NOT REACHED CENTERLINE  
 M 4238(131) 1.15 MODEL WAS NOT REACHED CENTERLINE  
 LS 2469(131) 1.15 MODEL WAS NOT REACHED CENTERLINE  
 T 4654(131) 2.23 MODEL WAS NOT REACHED CENTERLINE  
 M 4238(131) 2.23 MODEL WAS NOT REACHED CENTERLINE  
 LS 2469(131) 2.23 MODEL WAS NOT REACHED CENTERLINE  
 US 4654(131) 2.23 MODEL WAS NOT REACHED CENTERLINE  
 INJECT TIME 2.65

T 4654(131)	1.20	1.01	2.051E-03	.0419	2.493E-03	.0507	2.708E-03	.0567	0.771E-04
M 4238(131)	1.20	1.01	2.051E-03	.0419	2.493E-03	.0507	2.708E-03	.0567	0.771E-04
LS 2469(131)	1.20	1.01	2.051E-03	.0419	2.493E-03	.0507	2.708E-03	.0567	0.771E-04
US 4654(131)	1.20	1.01	2.051E-03	.0419	2.493E-03	.0507	2.708E-03	.0567	0.771E-04
T 4654(131)	2.23	1.06	2.051E-03	.0416	2.493E-03	.0504	2.708E-03	.0564	0.713E-04
M 4238(131)	2.23	1.06	2.051E-03	.0416	2.493E-03	.0504	2.708E-03	.0564	0.713E-04
LS 2469(131)	2.23	1.06	2.051E-03	.0416	2.493E-03	.0504	2.708E-03	.0564	0.713E-04
US 4654(131)	2.23	1.06	2.051E-03	.0416	2.493E-03	.0504	2.708E-03	.0564	0.713E-04
T 4654(131)	4.28	2.00	1.610E-03	.0332	1.975E-03	.0402	2.205E-03	.0450	6.348E-04
M 4238(131)	4.28	2.00	1.610E-03	.0332	1.975E-03	.0402	2.205E-03	.0450	6.348E-04
LS 2469(131)	4.28	2.00	1.610E-03	.0332	1.975E-03	.0402	2.205E-03	.0450	6.348E-04
US 4654(131)	4.28	2.00	1.610E-03	.0332	1.975E-03	.0402	2.205E-03	.0450	6.348E-04
T 4654(131)	5.46	3.07	1.341E-03	.0283	1.606E-03	.0343	1.806E-03	.0384	5.934E-04
M 4238(131)	5.46	3.07	1.341E-03	.0283	1.606E-03	.0343	1.806E-03	.0384	5.934E-04
LS 2469(131)	5.46	3.07	1.341E-03	.0283	1.606E-03	.0343	1.806E-03	.0384	5.934E-04
US 4654(131)	5.46	3.07	1.341E-03	.0283	1.606E-03	.0343	1.806E-03	.0384	5.934E-04
T 4654(131)	6.12	5.04	1.234E-03	.0251	1.495E-03	.0304	1.672E-03	.0340	5.261E-04
M 4238(131)	6.12	5.04	1.234E-03	.0251	1.495E-03	.0304	1.672E-03	.0340	5.261E-04
LS 2469(131)	6.12	5.04	1.234E-03	.0251	1.495E-03	.0304	1.672E-03	.0340	5.261E-04
US 4654(131)	6.12	5.04	1.234E-03	.0251	1.495E-03	.0304	1.672E-03	.0340	5.261E-04
T 4654(131)	7.61	6.12	1.120E-03	.0228	1.357E-03	.0276	1.518E-03	.0309	4.776E-04
M 4238(131)	7.61	6.12	1.120E-03	.0228	1.357E-03	.0276	1.518E-03	.0309	4.776E-04
LS 2469(131)	7.61	6.12	1.120E-03	.0228	1.357E-03	.0276	1.518E-03	.0309	4.776E-04
US 4654(131)	7.61	6.12	1.120E-03	.0228	1.357E-03	.0276	1.518E-03	.0309	4.776E-04

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6/29/73

NASA-RI ORBITER HEATING

VA2R9

AEDC(ARO, INC.) ARNOLD AFS, TENNESSEE  
VON KARMAN GAS DYNAMICS FACILITY  
50 INCH HYPERSONIC TUNNEL 9

GROUP CONF16 MODEL MACH NO PO(PSIA) TO(DEG R) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREBEND ROLL-MODEL YAW  
34 1 8.00 859.3 1358 .12 .12 0 180.00 .00

T-INF P-INF Q-INF V-INF MU-INF RE/FT MREF STREF  
(DEG R) (PSIA) (FT/SEC) (SLUGS/FT3) (LM-SEC/FT2) (FT-1) (R= .0175FT) (R= .0175FT)  
98.4 .088 3.943 388 7.506E-05 7.521E-08 3.685E 06 4.914E-02 2.113E-02

CAMERA ROLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHOXCK) THAR(TO) BETA(TO)  
TOP(1) 7855  
UPPER SIDE(US) 8049  
LOWER SIDE(LS) 7637  
BOTTOM(B) 7267

.0486

81

6.122E-02 5.7020E-02

PIC NO	TIME DELTME	H(TO)	M(TO)/HREF	M(-9TO)	M(-9TO)/HREF	M(-85TO)	M(-85TO)/HREF	ST(TO)
T 8465(131)	8.68	1.033E-03	.0210	1.252E-03	.0255	1.400E-03	.0285	4.402E-04
US 8473(131)	8.68	1.033E-03	.0210	1.252E-03	.0255	1.400E-03	.0285	4.402E-04
M 8474(131)	8.68	1.033E-03	.0210	1.252E-03	.0255	1.400E-03	.0285	4.402E-04
LS 2476(131)	8.68	1.033E-03	.0210	1.252E-03	.0255	1.400E-03	.0285	4.402E-04
T 8466(131)	9.76	9.635E-04	.0196	1.168E-03	.0238	1.306E-03	.0266	4.106E-04
US 8474(131)	9.76	9.635E-04	.0196	1.168E-03	.0238	1.306E-03	.0266	4.106E-04
M 8476(131)	9.76	9.635E-04	.0196	1.168E-03	.0238	1.306E-03	.0266	4.106E-04
LS 2477(131)	9.76	9.635E-04	.0196	1.168E-03	.0238	1.306E-03	.0266	4.106E-04
T 8467(131)	10.64	9.064E-04	.0184	1.098E-03	.0223	1.228E-03	.0250	3.862E-04
US 8475(131)	10.64	9.064E-04	.0184	1.098E-03	.0223	1.228E-03	.0250	3.862E-04
M 8477(131)	10.64	9.064E-04	.0184	1.098E-03	.0223	1.228E-03	.0250	3.862E-04
LS 2478(131)	10.64	9.064E-04	.0184	1.098E-03	.0223	1.228E-03	.0250	3.862E-04
T 8468(131)	11.51	8.543E-04	.0175	1.040E-03	.0212	1.163E-03	.0237	3.658E-04
US 8476(131)	11.51	8.543E-04	.0175	1.040E-03	.0212	1.163E-03	.0237	3.658E-04
M 8478(131)	11.51	8.543E-04	.0175	1.040E-03	.0212	1.163E-03	.0237	3.658E-04
LS 2479(131)	11.51	8.543E-04	.0175	1.040E-03	.0212	1.163E-03	.0237	3.658E-04
T 8469(131)	12.59	8.172E-04	.0166	9.902E-04	.0201	1.107E-03	.0225	3.482E-04
US 8477(131)	12.59	8.172E-04	.0166	9.902E-04	.0201	1.107E-03	.0225	3.482E-04
M 8479(131)	12.59	8.172E-04	.0166	9.902E-04	.0201	1.107E-03	.0225	3.482E-04
LS 2480(131)	12.59	8.172E-04	.0166	9.902E-04	.0201	1.107E-03	.0225	3.482E-04
T 8470(131)	14.04	7.822E-04	.0159	9.478E-04	.0193	1.060E-03	.0216	3.333E-04
US 8478(131)	14.07	7.814E-04	.0159	9.469E-04	.0193	1.059E-03	.0215	3.330E-04
M 8479(131)	14.07	7.814E-04	.0159	9.469E-04	.0193	1.059E-03	.0215	3.330E-04
LS 2481(131)	14.07	7.814E-04	.0159	9.469E-04	.0193	1.059E-03	.0215	3.330E-04
T 8471(131)	15.12	7.537E-04	.0153	9.096E-04	.0185	1.017E-03	.0207	3.199E-04

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8-29/73

NASA-RI ORBITER HEATING  
 VA289

AEDCIARD, INC. 1 ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL A

GROUP COMF16 MODEL MACH NO PO(PSIA) TO(DEG R) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREBEND ROLL-MODEL YAW  
 34 1 MATED 8.00 859.6 1358 .12 -.12 0 100.00 .00

T-INF P-INF O-INF V-INF RHO-INF MU-INF RE/FT HREF STREF  
 (DEG R) (PSIA) (FT/SEC) (SLUGS/FT3) (LR-SEC/FT2) (FT-1) (R= .0175FI) (R= .0175FI)  
 98.4 .088 3.945 3608 7.507E-05 7.922E-08 3.495E 06 4.915E-02 2.113E-02

CAMERA ROLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHO/CXK) TBAR(TO) BETA(TO)

TOP(T) 7855  
 UPPER SIDE(US) 8049  
 LOWER SIDE(LS) 7637  
 BOTTOM(B) 7267

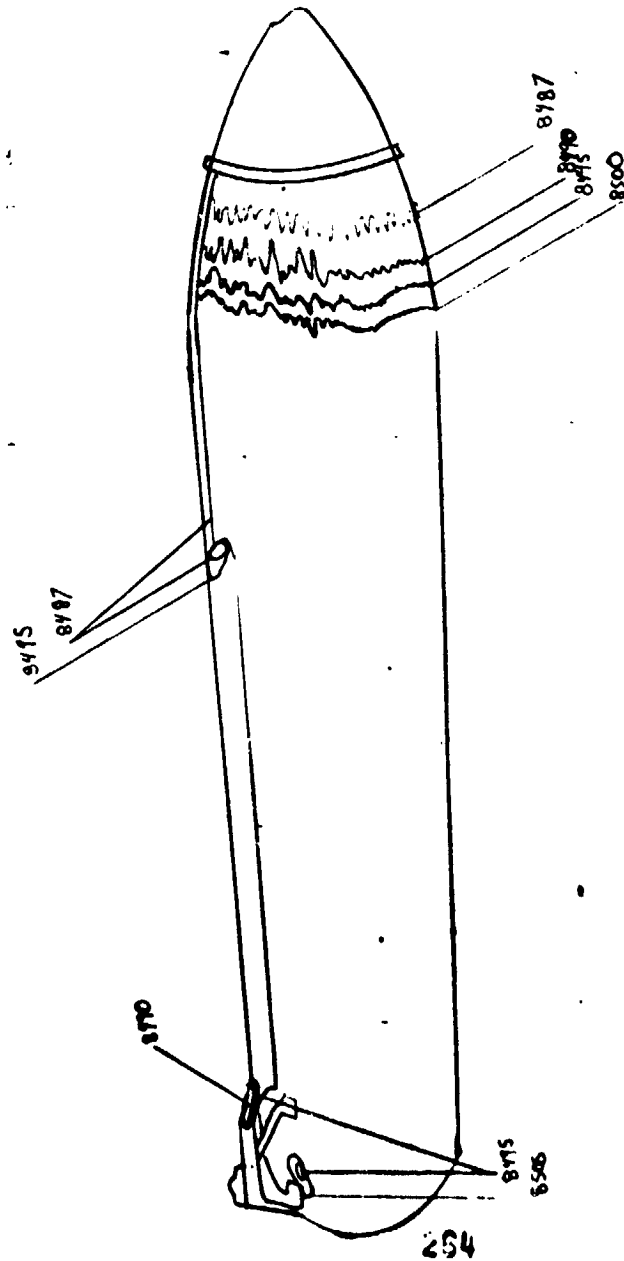
.0486

6.122E-02 5.7020E-02

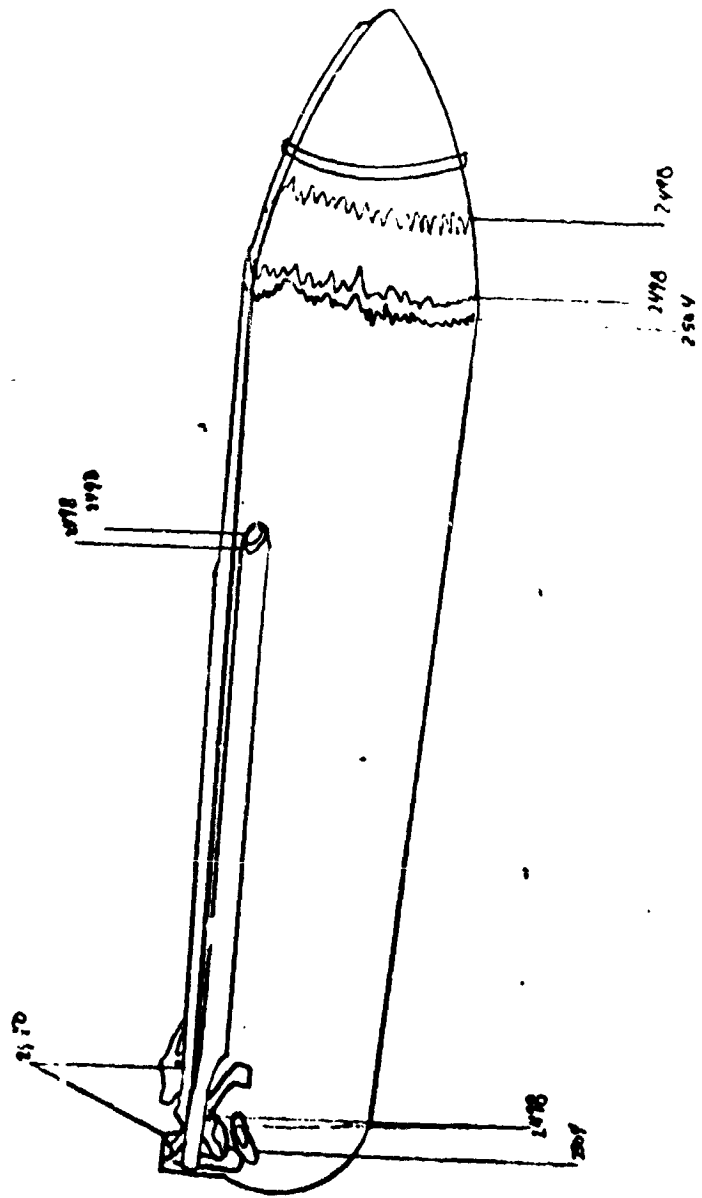
PIC NO	TIME DELT	H(TO)	M(TO)/HREF	M(.9TO)	M(.9TO)/HREF	M(.85TO)	M(.85TO)/HREF	ST(TO)
T 8471(131)	15.14	7.500E-04	.0153	9.888E-04	.0185	1.016E-03	.0207	3.197E-04
US 8479(131)	15.14	7.500E-04	.0153	9.888E-04	.0185	1.016E-03	.0207	3.197E-04
LS 2482(131)	15.14	7.500E-04	.0153	9.888E-04	.0185	1.016E-03	.0207	3.197E-04
T 8472(131)	16.19	7.227E-04	.0147	8.757E-04	.0178	9.794E-04	.0199	3.080E-04
US 8480(131)	16.19	7.227E-04	.0147	8.757E-04	.0178	9.794E-04	.0199	3.080E-04
LS 2483(131)	16.22	7.221E-04	.0147	8.750E-04	.0178	9.786E-04	.0199	3.077E-04
T 8473(131)	17.27	6.976E-04	.0142	8.533E-04	.0172	9.454E-04	.0192	2.972E-04
US 8481(131)	17.27	6.976E-04	.0142	8.533E-04	.0172	9.454E-04	.0192	2.972E-04
LS 2484(131)	17.29	6.970E-04	.0142	8.446E-04	.0172	9.447E-04	.0192	2.971E-04
T 8474(131)	18.25	6.750E-04	.0137	8.179E-04	.0166	9.147E-04	.0186	2.878E-04
US 8482(131)	18.25	6.750E-04	.0137	8.179E-04	.0166	9.147E-04	.0186	2.878E-04
LS 2485(131)	18.27	6.745E-04	.0137	8.173E-04	.0166	9.141E-04	.0186	2.876E-04
MODEL HAS LEFT CENTERLINE								
T 8475(131)	19.25	6.544E-04	.0133	7.930E-04	.0161	8.869E-04	.0180	2.788E-04
US 8483(131)	19.25	6.544E-04	.0133	7.930E-04	.0161	8.869E-04	.0180	2.788E-04
LS 2486(131)	19.25	6.539E-04	.0133	7.924E-04	.0161	8.862E-04	.0180	2.786E-04
T 8476(131)	20.50	6.356E-04	.0129	7.702E-04	.0157	8.614E-04	.0175	2.708E-04
US 8484(131)	20.50	6.356E-04	.0129	7.702E-04	.0157	8.614E-04	.0175	2.708E-04
LS 2487(131)	20.52	6.352E-04	.0129	7.697E-04	.0157	8.608E-04	.0175	2.706E-04

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8049  
GP 35  
Upper Side

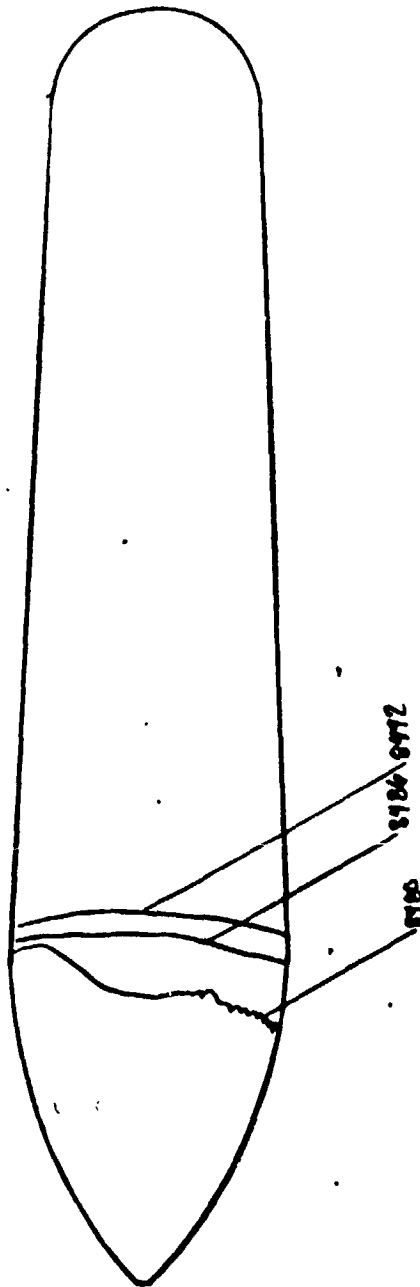


7637  
GP 35  
Lower Side

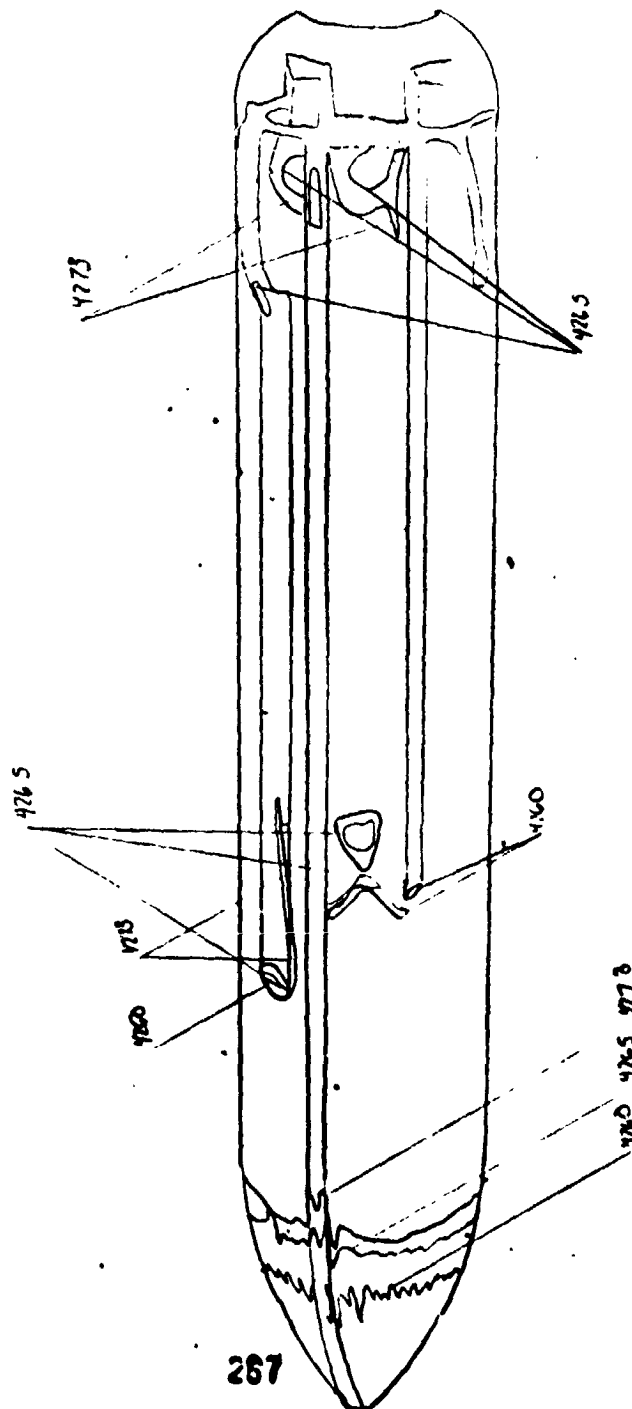


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Imp 35  
78 5.5  
Top  
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Group 35  
Bottom  
7267  
100





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6/29/73

NASA-RI ORBITER HEATING

AEDC(ARO, INC.) ARNOLD AFS, TENNESSEE  
VON KARMAN GAS DYNAMICS FACILITY  
50 INCH HYPERSONIC TUNNEL R

VA299

GROUP	CONFID	MODEL	MACH NO	POI(PSIA)	TO( DEG R)	ALPHA-MODEL	ALPHA-SECTOR	ALPHA-PREBEND	ROLL-MODEL	YAW
35	0	TANK	8.00	856.5	1360	.12	-.12	0	180.00	.00
T-INF	P-INF	Q-INF	V-INF	RHO-INF	MU-INF	RE/FT	MREF	STREF		
(DEG R)	(PSIA)	(PSIA)	(FT/SFC)	(SLUGS/FT <sup>3</sup> )	(LR-SEC/FT <sup>2</sup> )	(FT-1)	(R= .0175FI)	(R= .0175FI)		
98.5	.088	3.939	3891	7.488E-05	7.933E-08	3.73E 06	4.913E-02	2.116E-02		
CAMERA	ROLL NO	PAINT TEMP (DEG F)	INITIAL TEMP (DEG F)	SQUARE ROOT (RHOXCK)	TRAR(10)	BETA(10)				
TOP(1)	7855									
UPPER SIDE(US)	8049									
LOWER SIDE(LS)	7637									
NOTCH(0)	7267									

PIC NO	TIME DELTIME	M(10)	M(10)/MREF	M(1.9T0)	M(1.85T0)	M(1.85T0)/MREF	ST(10)
R 4257(200)	1.13	MODEL HAS NOT REACHED CENTERLINE	6.922E-03	.1408	7.832E-03	.1593	2.387E-03
T 8477(200)	1.15	MODEL HAS NOT REACHED CENTERLINE	6.922E-03	.1408	7.832E-03	.1593	2.387E-03
US 8485(200)	1.15	MODEL HAS NOT REACHED CENTERLINE	6.922E-03	.1408	7.832E-03	.1593	2.387E-03
LS 2488(200)	1.15	MODEL HAS NOT REACHED CENTERLINE	6.922E-03	.1408	7.832E-03	.1593	2.387E-03
T 8478(200)	2.23	MODEL HAS NOT REACHED CENTERLINE	6.922E-03	.1408	7.832E-03	.1593	2.387E-03
M 4258(200)	2.23	MODEL HAS NOT REACHED CENTERLINE	6.922E-03	.1408	7.832E-03	.1593	2.387E-03
LS 2489(200)	2.23	MODEL HAS NOT REACHED CENTERLINE	6.922E-03	.1408	7.832E-03	.1593	2.387E-03
US 8486(200)	2.25	MODEL HAS NOT REACHED CENTERLINE	6.922E-03	.1408	7.832E-03	.1593	2.387E-03
INJECT TIME = 2.65							
T 8474(200)	3.30	5.619E-03	.1143	.1408	7.832E-03	.1593	2.387E-03
M 4254(200)	3.30	5.619E-03	.1143	.1408	7.832E-03	.1593	2.387E-03
LS 2490(200)	3.30	5.619E-03	.1143	.1408	7.832E-03	.1593	2.387E-03
US 8487(200)	3.33	5.540E-03	.1135	.1398	7.799E-03	.1582	2.370E-03
T 8480(200)	2.89	4.452E-03	.0905	.1115	6.205E-03	.1262	1.890E-03
M 4260(200)	2.89	4.452E-03	.0905	.1115	6.205E-03	.1262	1.890E-03
LS 2491(200)	2.89	4.452E-03	.0905	.1115	6.205E-03	.1262	1.890E-03
US 8488(200)	4.41	4.452E-03	.0902	.1111	6.179E-03	.1257	1.882E-03
T 8481(200)	5.46	3.801E-03	.0773	.0952	5.297E-03	.1077	1.614E-03
M 4261(200)	5.46	3.801E-03	.0773	.0952	5.297E-03	.1077	1.614E-03
LS 2492(200)	5.46	3.748E-03	.0770	.0949	5.280E-03	.1074	1.609E-03
US 8489(200)	5.48	3.748E-03	.0770	.0949	5.280E-03	.1074	1.609E-03
T 8492(200)	6.53	3.370E-03	.0685	.0844	4.698E-03	.0945	1.431E-03
M 4262(200)	6.53	3.370E-03	.0685	.0844	4.698E-03	.0945	1.431E-03
LS 2493(200)	6.56	3.362E-03	.0684	.0842	4.686E-03	.0933	1.428E-03
US 8490(200)	6.56	3.362E-03	.0684	.0842	4.686E-03	.0933	1.428E-03
T 8493(200)	7.61	3.060E-03	.0522	.0766	4.265E-03	.0867	1.299E-03
M 4263(200)	7.61	3.060E-03	.0522	.0766	4.265E-03	.0867	1.299E-03

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6/29/73

AECIO(ARO-INC-1) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL W

NASA-WI ORBITER HEATING

VA299

GROUP	CONFIG	MODEL	TANK	MACH NO	PO(PISA)	TO(DEG R)	ALPHA-MODEL	ALPHA-SECTOR	ALPHA-PREBEND	ROLL-MODEL	YAW
35	R			8.00	860.1	1360	.12	-.12	0	100.00	.00
T-INF P-INF Q-INF V-INF MU-INF H/FT MREF STREF											
(DFG R)	(PQIA)	(PSIA)	(FT/SFC)	(SLUGS/FT3)	(L/R-SEC/FT2)	(FT-1)	(R=)	(R=)	(R=)	(R=)	(R=)
9P-5	.088	3.947	3091	7.502E-05	7.932E-08	3.630E 06	4.917E-02	2.114E-02			
CAMERA	ROLL NO	PAINT	TFMP (DEG F)	INITIAL TEMP (DEG F)	SQUARE ROOT (RHOKCKX)	TRAR(TOI)	BETAITO)				
TOP(1)	7655										
UPPER SIDE(LS)	8049										
LOWER SIDE(LS)	7637										
BOTTOM(LS)	7267										

PIC NO	TIME	DELTIME	M(TO)	M(TOI)/MREF	M(L9TO)	M(L9TOI)/MREF	M(L85TO)	M(L85TOI)/MREF	ST(TOI)
US 4491(200)	7.63	6.14	3.053E-03	.0621	3.761E-03	.0745	4.254E-03	.0866	1.296E-03
LS 2494(200)	7.63	6.14	3.053E-03	.0621	3.761E-03	.0745	4.254E-03	.0866	1.296E-03
Y 4484(200)	8.68	7.20	2.821E-03	.0574	3.476E-03	.0707	3.933E-03	.0800	1.198E-03
W 4264(200)	8.68	7.20	2.821E-03	.0574	3.476E-03	.0707	3.933E-03	.0800	1.198E-03
US 4492(200)	8.71	7.22	2.817E-03	.0573	3.470E-03	.0706	3.928E-03	.0799	1.196E-03
LS 2495(200)	8.71	7.22	2.817E-03	.0573	3.470E-03	.0706	3.928E-03	.0799	1.196E-03
Y 4485(200)	9.76	8.27	2.632E-03	.0535	3.242E-03	.0659	3.668E-03	.0746	1.117E-03
W 4265(200)	9.76	8.27	2.632E-03	.0535	3.242E-03	.0659	3.668E-03	.0746	1.117E-03
US 4493(200)	9.79	8.30	2.628E-03	.0534	3.237E-03	.0658	3.663E-03	.0745	1.115E-03
LS 2496(200)	9.79	8.30	2.628E-03	.0534	3.237E-03	.0658	3.663E-03	.0745	1.115E-03
Y 4486(200)	10.84	9.35	2.475E-03	.0503	3.049E-03	.0620	3.451E-03	.0702	1.051E-03
W 4266(200)	10.84	9.35	2.475E-03	.0503	3.049E-03	.0620	3.451E-03	.0702	1.051E-03
US 4494(200)	10.86	9.37	2.472E-03	.0503	3.048E-03	.0619	3.448E-03	.0701	1.049E-03
LS 2497(200)	10.86	9.37	2.472E-03	.0503	3.048E-03	.0619	3.448E-03	.0701	1.049E-03
Y 4487(200)	11.51	10.42	2.344E-03	.0477	2.888E-03	.0587	3.268E-03	.0664	9.950E-04
W 4267(200)	11.51	10.42	2.344E-03	.0477	2.888E-03	.0587	3.268E-03	.0664	9.950E-04
US 4495(200)	11.54	10.45	2.341E-03	.0476	2.884E-03	.0587	3.268E-03	.0664	9.950E-04
LS 2498(200)	11.54	10.45	2.341E-03	.0476	2.884E-03	.0587	3.268E-03	.0664	9.950E-04
Y 4488(200)	12.59	11.50	2.232E-03	.0454	2.749E-03	.0559	3.111E-03	.0633	9.472E-04
W 4268(200)	12.59	11.50	2.232E-03	.0454	2.749E-03	.0559	3.111E-03	.0633	9.472E-04
US 4496(200)	12.59	11.50	2.232E-03	.0454	2.749E-03	.0559	3.111E-03	.0633	9.472E-04
LS 2499(200)	12.59	11.50	2.232E-03	.0454	2.749E-03	.0559	3.111E-03	.0633	9.472E-04
Y 4489(200)	13.01	11.53	2.229E-03	.0453	2.746E-03	.0558	3.108E-03	.0632	9.462E-04
W 4269(200)	14.07	12.58	2.134E-03	.0434	2.629E-03	.0535	2.975E-03	.0605	9.059E-04
US 4497(200)	14.07	12.58	2.134E-03	.0434	2.629E-03	.0535	2.975E-03	.0605	9.059E-04
LS 2500(200)	14.07	12.58	2.134E-03	.0434	2.629E-03	.0535	2.975E-03	.0605	9.059E-04

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6/29/73

NASA-RE ORBITER HEATING

VAZ89

AEC(ARO-INC.) AR-OLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL A

GROUP CAMF16 MODEL MACH NO PO(PSIA) T/IDEG R ALPHA-MODEL ALPHA-SECTOR ALPHA-PREBEND ROLL-MODEL YAW  
 35 8 TANK 8.08 668.3 1359 .12 .12 0 100.00 .00

T-INF P-INF Q-INF V-INF RHO-INF MU-INF RE/FT HREF STREF  
 (IDEG R) (PSIA) (FT/SEC) (SLUGS/FT3) (LR-SEC/FT2) (FT-1) (R=.0175FT) (R=.0175FT)  
 9A.5 .088 3.948 3891 7.505E-05 7.931E-08 3.681E 06 4.918E-02 2.114E-02

CAMERA ROLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHOXCKX) TRAIL(TO) BETA(TO)  
 TOP(T) 7855  
 UPPER SIDE(US) 849  
 LOWER SIDE(LS) 7437  
 MOTTCH(M) 7287

200 81 .0519 1.454E-01 1.4583E-01

PIC NO	TIME DELT	M(TO)/HREF	M(.9TO)	M(.9TO)/HREF	M(.85TO)	M(.85TO)/HREF	ST(TO)
US 8491(200)	14.09	1.432E-03	2.826E-03	.0513	2.972E-03	.0404	9.052E-04
T 8491(200)	15.14	2.848E-03	2.523E-03	.0513	2.853E-03	.0501	8.693E-04
M 8491(200)	15.14	2.848E-03	2.523E-03	.0513	2.853E-03	.0501	8.693E-04
LS 2501(200)	15.14	2.848E-03	2.523E-03	.0513	2.853E-03	.0501	8.693E-04
US 8491(200)	15.17	2.848E-03	2.523E-03	.0513	2.853E-03	.0501	8.693E-04
T 8491(200)	16.22	1.972E-03	2.429E-03	.0494	2.749E-03	.0559	8.370E-04
M 8491(200)	16.22	1.972E-03	2.429E-03	.0494	2.749E-03	.0559	8.370E-04
LS 2502(200)	16.22	1.972E-03	2.429E-03	.0494	2.749E-03	.0559	8.370E-04
US 8491(200)	16.24	1.972E-03	2.429E-03	.0494	2.749E-03	.0559	8.370E-04
T 8492(200)	17.29	1.944E-03	2.345E-03	.0477	2.654E-03	.0539	8.075E-04
M 8492(200)	17.29	1.944E-03	2.345E-03	.0477	2.654E-03	.0539	8.075E-04
LS 2503(200)	17.29	1.944E-03	2.345E-03	.0477	2.654E-03	.0539	8.075E-04
US 8493(200)	17.22	1.944E-03	2.345E-03	.0477	2.654E-03	.0539	8.075E-04
T 8493(200)	18.37	1.842E-03	2.268E-03	.0461	2.568E-03	.0522	7.816E-04
M 8493(200)	18.37	1.842E-03	2.268E-03	.0461	2.568E-03	.0522	7.816E-04
LS 2504(200)	18.37	1.842E-03	2.268E-03	.0461	2.568E-03	.0522	7.816E-04
US 8494(200)	18.40	1.842E-03	2.268E-03	.0461	2.568E-03	.0522	7.816E-04
T 8494(200)	19.42	1.747E-03	2.202E-03	.0449	2.491E-03	.0506	7.583E-04
M 8494(200)	19.42	1.747E-03	2.202E-03	.0449	2.491E-03	.0506	7.583E-04
LS 2505(200)	19.45	1.746E-03	2.202E-03	.0447	2.490E-03	.0506	7.577E-04
US 8495(200)	19.45	1.746E-03	2.202E-03	.0447	2.490E-03	.0506	7.577E-04
T 8495(200)	20.50	1.736E-03	2.139E-03	.0435	2.426E-03	.0492	7.362E-04
M 8495(200)	20.50	1.736E-03	2.139E-03	.0435	2.426E-03	.0492	7.362E-04
LS 2506(200)	20.50	1.736E-03	2.139E-03	.0435	2.426E-03	.0492	7.362E-04

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6/29/73

NASA-RI ORBITER HEATING

VA200

AEDC(ARO,INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL #

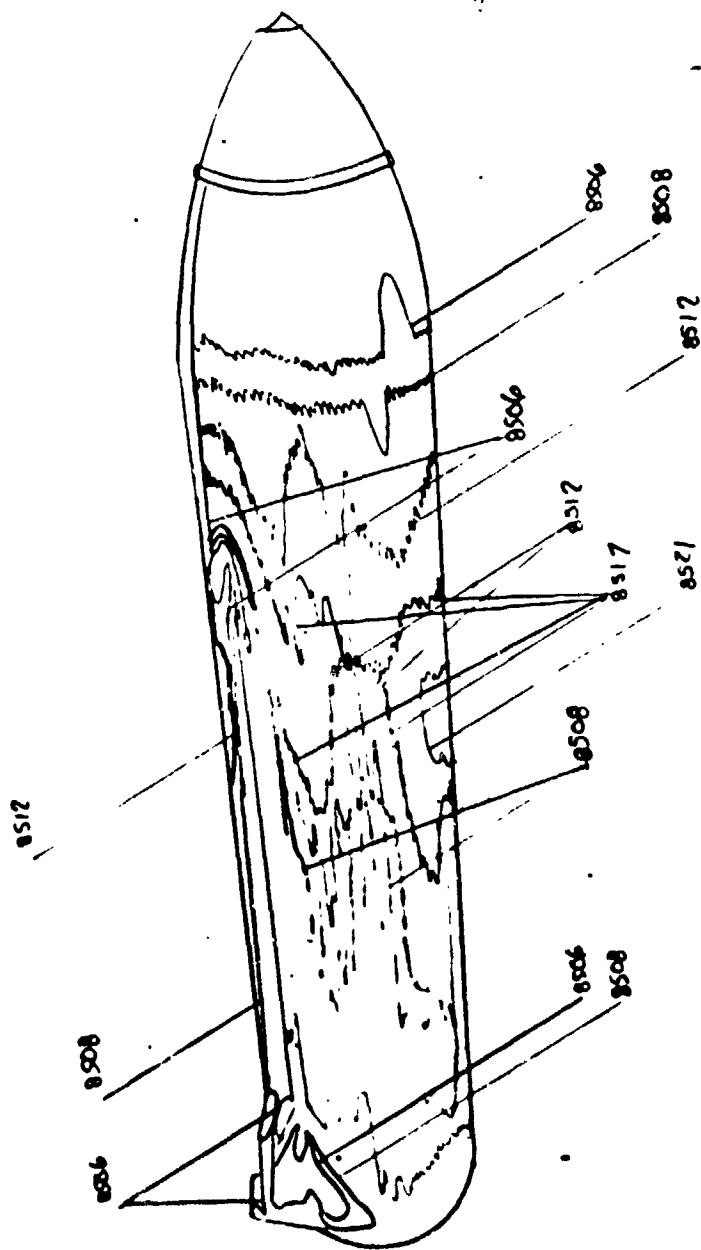
GROUP	CONFID	MODEL	MACH NO	PO(PISA)	TO( DEG R)	ALPHA-HOVEL	ALPHA-SECTOR	ALPHA-PREBEND	ROLL-MODEL	YAW
35	A	TANK	6.00	861.1	1360	.12	-.12	0	100.00	.00
T-1A	P-1A	Q-1A	V-1A	W-1A	NU-1A	RE/FT	HREF	SYREF		
(DEG R)	(PSIA)	(PSIA)	(FT/SEC)	(SLUGS/FT3)	(LB-SEC/FT2)	(FT-1)	(R= .0175FT)	(R= .0175FT)		
94.5	.000	3.951	3691	7.511E-05	7.932E-08	3.485E 06	4.920E-02	.113E-02		
CAMERA	ROLL NO	PAINT TEMP (DEG F)	INITIAL TEMP (DEG F)	SQUARE ROOT (RHO/ACX)	TRAR(ITO)	BETA(ITO)				
TOP(IT)	7855			.0519	1.454E-01	1.4503E-01				
UPPER SIDE(US)	8049									
LOWER SIDE(LS)	7637									
BOTTOM(B)	7267									

PIC NO	TIME DELTIME	M(ITO)	M(ITO)/MREF	M(.970)	M(.970)/MREF	M(.85TO)	M(.85TO)/MREF	ST(ITO)
US 5503(50)	20.52	19.03	1.735E-03	.0353	2.137E-03	.0434	2.418E-03	.0492
								7.350E-04

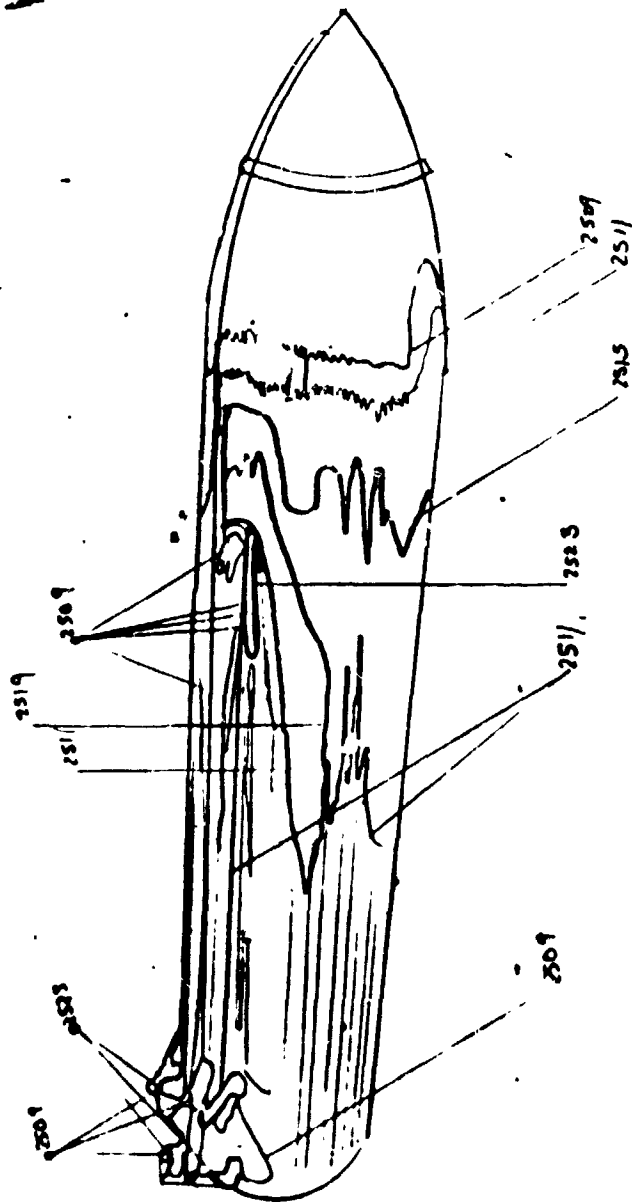
155

271

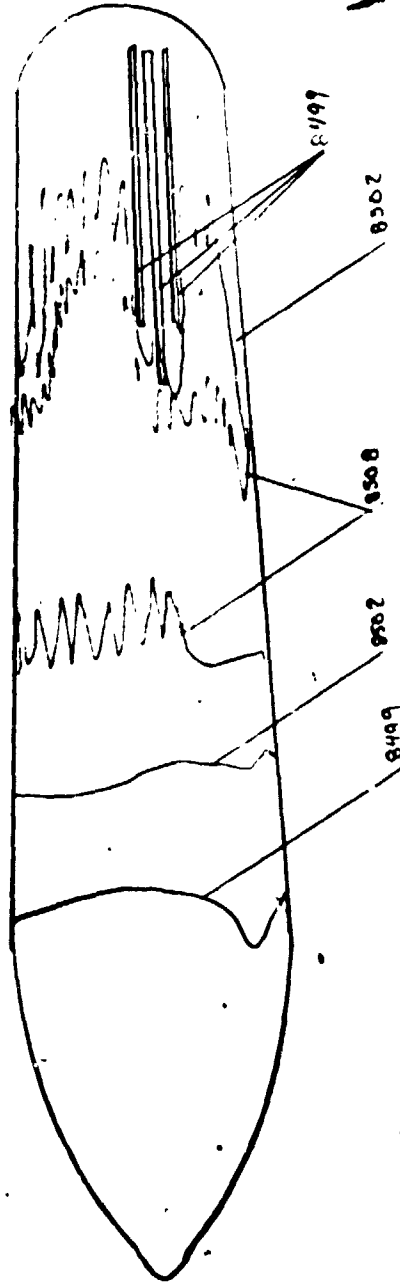
8049  
CP36  
Upper  
Side

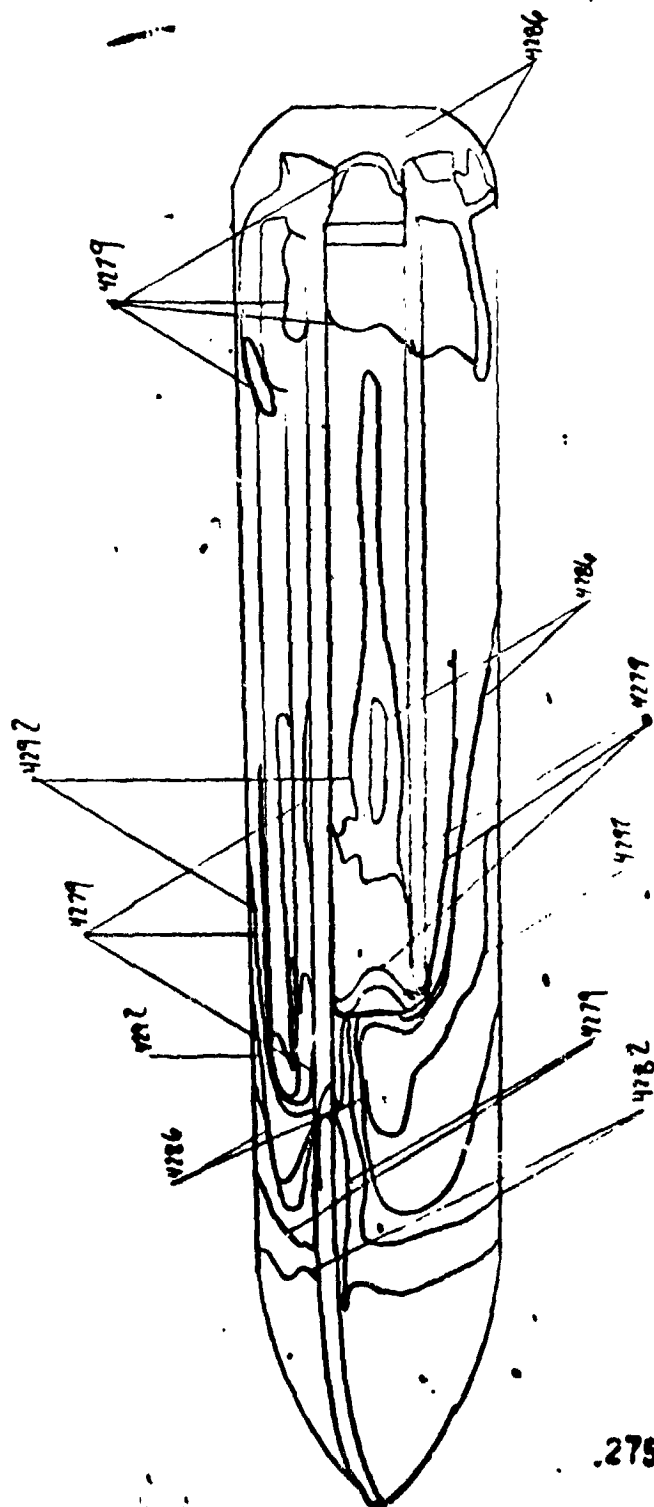


7637  
C P 36  
Lamin S. 14



Group 36  
7055  
Top  
ms







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6/29/73

# NASA-RI ORBITER HEATING

VA299

AEDC(ARO, NC) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL A

GROUP CONFIG MODEL MACH NO PO(PSIA) TO(DEG R) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREBEND ROLL-MODEL YAW

36 8 TANK 8.00 860.6 1357 .11 -.11 0 180.00 .00

T-INF P-INF Q-INF V-INF RHO-INF MU-INF RE/PT HREF STREF

(DEG R) (PSIA) (FT/SEC) (SLUGS/FT3) (LB-SEC/FT2) (FT-1) (R=.0175FT) (R=.0175FT)

98.3 .088 3.949 .3887 7.520E-05 7.918E-08 3.492E 66 4.917E-02 2.111E-02

CAPRA ROLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHO/CXK) TBAR(TO) BETA(TO)

TOP(T) 7655 113 81 .0475 0 0

UPPER SIDE(US) 8049

LOWER SIDE(LS) 7637

WOTTON(MB) 7267

PTC NO TIME DELTIME HITO) HITO)/HREF MI(OTO) MI(OTO)/HREF MI(OSTO) MI(OSTO)/HREF ST(TO)

T 8496(113) 1.15 1.264E-03 .0257 1.526E-03 .0310 1.702E-03 .0346 5.384E-04

M 4276(113) 1.15 1.264E-03 .0257 1.526E-03 .0310 1.702E-03 .0346 5.384E-04

LS 2507(113) 1.15 1.264E-03 .0257 1.526E-03 .0310 1.702E-03 .0346 5.384E-04

US 8504(113) 1.18 1.264E-03 .0255 1.516E-03 .0308 1.690E-03 .0344 5.347E-04

T 8497(113) 2.23 1.002E-03 .0204 1.209E-03 .0246 1.348E-03 .0274 4.265E-04

M 4277(113) 2.23 1.002E-03 .0204 1.209E-03 .0246 1.348E-03 .0274 4.265E-04

LS 2508(113) 2.23 1.002E-03 .0204 1.209E-03 .0246 1.348E-03 .0274 4.265E-04

US 8505(113) 2.25 1.002E-03 .0204 1.209E-03 .0246 1.348E-03 .0274 4.265E-04

INJECT TIME = 2.65

T 8498(113) 3.30 1.81 1.264E-03 .0257 1.526E-03 .0310 1.702E-03 .0346 5.384E-04

M 4278(113) 3.30 1.81 1.264E-03 .0257 1.526E-03 .0310 1.702E-03 .0346 5.384E-04

LS 2509(113) 3.30 1.81 1.264E-03 .0257 1.526E-03 .0310 1.702E-03 .0346 5.384E-04

US 8506(113) 3.33 1.84 1.264E-03 .0255 1.516E-03 .0308 1.690E-03 .0344 5.347E-04

T 8499(113) 4.28 2.89 1.002E-03 .0204 1.209E-03 .0246 1.348E-03 .0274 4.265E-04

M 4279(113) 4.28 2.89 1.002E-03 .0204 1.209E-03 .0246 1.348E-03 .0274 4.265E-04

LS 2510(113) 4.38 2.89 1.002E-03 .0204 1.209E-03 .0246 1.348E-03 .0274 4.265E-04

US 8507(113) 4.41 2.92 9.972E-04 .0203 1.204E-03 .0245 1.343E-03 .0273 4.246E-04

T 8500(113) 5.46 3.97 8.550E-04 .0174 1.032E-03 .0210 1.151E-03 .0234 3.644E-04

M 4280(113) 5.46 3.97 8.550E-04 .0174 1.032E-03 .0210 1.151E-03 .0234 3.644E-04

LS 2511(113) 5.48 3.99 8.550E-04 .0174 1.032E-03 .0210 1.151E-03 .0234 3.644E-04

US 8508(113) 5.48 3.99 8.550E-04 .0174 1.032E-03 .0210 1.151E-03 .0234 3.644E-04

T 8501(113) 6.53 5.04 7.543E-04 .0154 9.156E-04 .0186 1.021E-03 .0208 3.229E-04

M 4281(113) 6.53 5.04 7.543E-04 .0154 9.156E-04 .0186 1.021E-03 .0208 3.229E-04

LS 2512(113) 6.53 5.04 7.543E-04 .0154 9.156E-04 .0186 1.021E-03 .0208 3.229E-04

US 8509(113) 6.56 5.07 7.544E-04 .0154 9.133E-04 .0186 1.019E-03 .0207 3.220E-04

T 8502(113) 7.61 6.12 6.884E-04 .0140 8.312E-04 .0169 9.268E-04 .0188 2.931E-04

M 4282(113) 7.61 6.12 6.884E-04 .0140 8.312E-04 .0169 9.268E-04 .0188 2.931E-04

LS 2513(113) 7.61 6.12 6.884E-04 .0140 8.312E-04 .0169 9.268E-04 .0188 2.931E-04

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6/29/73

AEDC(ARO, INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL R

NASA-RI ORBITER HEATING  
 VA249

GROUP	CONFIG	MODEL	TANK	MACH NO	PO(PSIA)	TO(DEG R)	ALPHA-MODEL	ALPHA-SECTOR	ALPHA-PREBEND	ROLL-MODEL	YAW
36	9			8.00	861.0	1357	.11	-.11	0	180.00	.00
T-1AF	P-1NF	Q-1NF	V-1NF	RHO-1NF	MU-1NF	RE-1NF	HREF	STREF			
(DEG R)	(PSIA)	(FT/SFC)	(FT/SEC)	(FT/1)	(R=)	(R=)	(R=)	(R=)			
98.3	.088	3.951	3887	7.424E-05	7.918E-08	3.694E 06	4.918E-02	2.111E-02			
CAMERA	ROLL NO	PAINT TEMP (DEG F)	INITIAL TEMP (DEG F)	SQUARE ROOT (RHO/CXK)	TBAR(ITO)	BETA(ITO)					
TOP (T)	7655										
UPPER SIDE (US)	8049										
LOWER SIDE (LS)	7637										
BOTTOM (B)	7267										

PIC NO	TIME DELTIME	M(ITO)	M(ITO)/HREF	M(.9TO)	M(.9TO)/HREF	M(.85TO)	M(.85TO)/HREF	ST(ITO)
T 4503(113)	8.66	7.17	6.359E-04	7.679E-04	.0156	8.562E-04	.0174	2.707E-04
M 4283(113)	8.66	7.17	6.359E-04	7.679E-04	.0156	8.562E-04	.0174	2.707E-04
LS 2514(113)	8.66	7.17	6.359E-04	7.679E-04	.0156	8.562E-04	.0174	2.707E-04
US 4511(113)	8.68	7.20	6.348E-04	7.665E-04	.0156	8.547E-04	.0174	2.703E-04
T 4504(113)	9.74	8.25	5.930E-04	7.160E-04	.0146	7.983E-04	.0162	2.524E-04
US 4512(113)	9.74	8.25	5.930E-04	7.160E-04	.0146	7.983E-04	.0162	2.524E-04
M 4284(113)	9.74	8.25	5.930E-04	7.160E-04	.0146	7.983E-04	.0162	2.524E-04
LS 2515(113)	9.74	8.25	5.930E-04	7.160E-04	.0146	7.983E-04	.0162	2.524E-04
T 4505(113)	10.81	9.32	5.577E-04	6.734E-04	.0137	7.508E-04	.0153	2.374E-04
US 4513(113)	10.81	9.32	5.577E-04	6.734E-04	.0137	7.508E-04	.0153	2.374E-04
M 4285(113)	10.81	9.32	5.577E-04	6.734E-04	.0137	7.508E-04	.0153	2.374E-04
LS 2514(113)	10.81	9.32	5.577E-04	6.734E-04	.0137	7.508E-04	.0153	2.374E-04
T 4506(113)	11.86	10.37	5.247E-04	6.384E-04	.0130	7.118E-04	.0145	2.250E-04
US 4514(113)	11.86	10.37	5.247E-04	6.384E-04	.0130	7.118E-04	.0145	2.250E-04
M 4286(113)	11.86	10.37	5.247E-04	6.384E-04	.0130	7.118E-04	.0145	2.250E-04
LS 2517(113)	11.86	10.37	5.247E-04	6.384E-04	.0130	7.118E-04	.0145	2.250E-04
T 4507(113)	11.89	10.40	5.240E-04	6.376E-04	.0130	7.109E-04	.0145	2.247E-04
US 4515(113)	11.89	10.40	5.240E-04	6.376E-04	.0130	7.109E-04	.0145	2.247E-04
M 4287(113)	11.89	10.40	5.240E-04	6.376E-04	.0130	7.109E-04	.0145	2.247E-04
LS 2518(113)	11.89	10.40	5.240E-04	6.376E-04	.0130	7.109E-04	.0145	2.247E-04
T 4508(113)	12.56	11.45	5.032E-04	6.076E-04	.0124	6.775E-04	.0138	2.142E-04
US 4516(113)	12.56	11.45	5.032E-04	6.076E-04	.0124	6.775E-04	.0138	2.142E-04
M 4288(113)	12.56	11.45	5.032E-04	6.076E-04	.0124	6.775E-04	.0138	2.142E-04
LS 2519(113)	12.56	11.45	5.032E-04	6.076E-04	.0124	6.775E-04	.0138	2.142E-04
T 4509(113)	14.02	12.53	4.811E-04	5.809E-04	.0118	6.478E-04	.0132	2.048E-04
US 4517(113)	14.02	12.53	4.811E-04	5.809E-04	.0118	6.478E-04	.0132	2.048E-04
M 4289(113)	14.02	12.53	4.811E-04	5.809E-04	.0118	6.478E-04	.0132	2.048E-04
LS 2520(113)	14.02	12.53	4.811E-04	5.809E-04	.0118	6.478E-04	.0132	2.048E-04
T 4510(113)	15.09	13.60	4.617E-04	5.575E-04	.0113	6.216E-04	.0126	1.966E-04
US 4518(113)	15.09	13.60	4.617E-04	5.575E-04	.0113	6.216E-04	.0126	1.966E-04
M 4290(113)	15.09	13.60	4.617E-04	5.575E-04	.0113	6.216E-04	.0126	1.966E-04
LS 2521(113)	15.09	13.60	4.617E-04	5.575E-04	.0113	6.216E-04	.0126	1.966E-04

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6/29/73

## NASA-BI ORBITER HEATING

VA209

AEDC(ARO, INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL #

GROUP CONFIG MODEL MACH NO PO(PSTIA) TO(DEG R) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREBEND ROLL-MODEL YAW  
 36 0 TANK 0.00 860.8 1357 .11 .11 0 180.00 .00

T-INF P-INF Q-INF V-INF MU-INF RMO-INF MU-INF RE/FT MREF STREF  
 (DEG R) (PSTIA) (FT/SEC) (SLUGS/FT3) (LBS-SEC/FT2) (FT-1) (R=.0175FT) (R=.0175FT)  
 9A.3 .088 3.950 3887 7.423E-05 7.917E-08 3.494E 06 4.918E-02 2.111E-02

CAMERA ROLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RMORCK) TRARITO BETA(TO)

TOP(T) 7655  
 UPPER SINE(UIS) 8049  
 LOWER SINE(LS) 7637  
 MOTICH(B) 7267

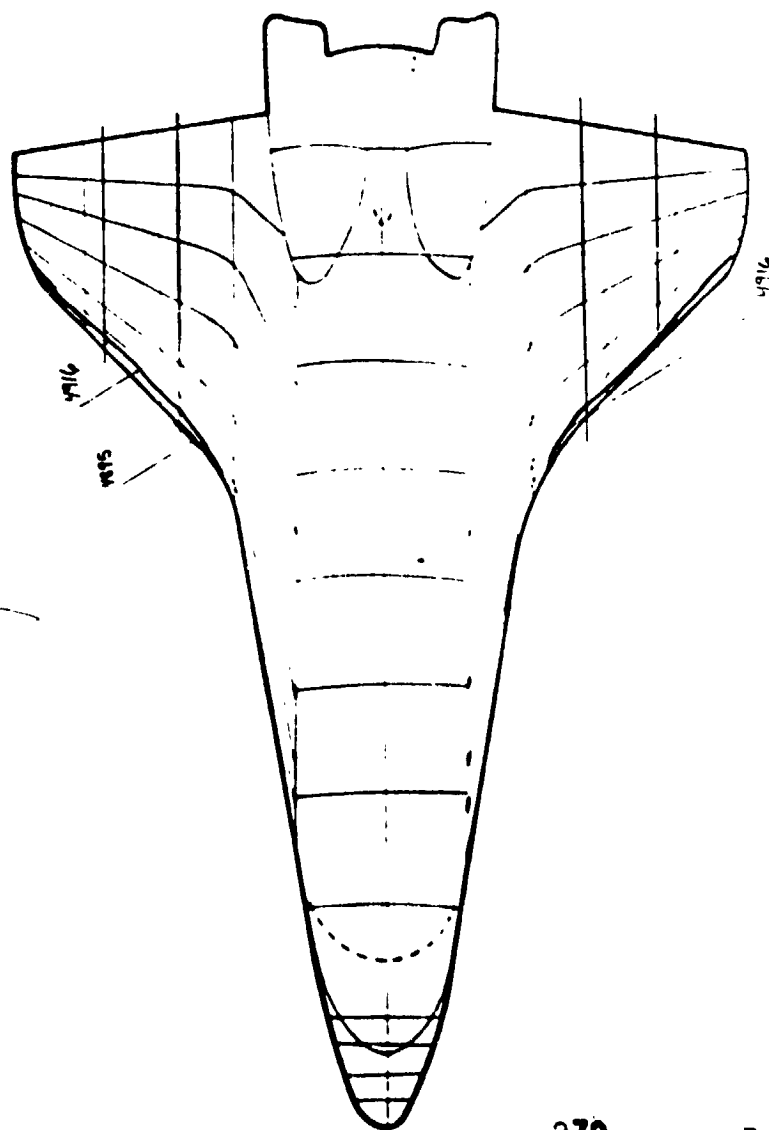
.0475

3.921E-02 3.5849E-02

PIC NO TIME DELTIME H(TO) H(TO)/HREF H(1.9TO) H(1.9TO)/HREF H(1.85TO) H(1.85TO)/HREF ST(TO)  
 US AS17(113) 15.12 13.63 4.613E-04 .0094 5.570E-04 .0113 6.210E-04 .0126 1.965E-04  
 T AS10(113) 16.37 14.88 4.414E-04 .0090 5.330E-04 .0108 5.943E-04 .0121 1.879E-04  
 M AS20(113) 16.37 14.88 4.414E-04 .0090 5.330E-04 .0108 5.943E-04 .0121 1.879E-04  
 US AS12(113) 16.39 14.90 4.411E-04 .0090 5.326E-04 .0108 5.938E-04 .0121 1.877E-04  
 LS AS21(113) 16.39 14.90 4.411E-04 .0090 5.326E-04 .0108 5.938E-04 .0121 1.877E-04  
 MODEL WAS LEFT CENTERLINE  
 T AS11(113) 17.45 15.96 4.263E-04 .0087 5.148E-04 .0105 5.739E-04 .0117 1.815E-04  
 M AS19(113) 17.45 15.96 4.263E-04 .0087 5.148E-04 .0105 5.739E-04 .0117 1.815E-04  
 US AS19(113) 17.47 15.96 4.260E-04 .0087 5.143E-04 .0105 5.735E-04 .0117 1.814E-04  
 LS AS22(113) 17.47 15.96 4.260E-04 .0087 5.143E-04 .0105 5.735E-04 .0117 1.814E-04  
 T AS12(113) 18.52 17.03 4.126E-04 .0084 4.982E-04 .0101 5.555E-04 .0113 1.756E-04  
 M AS22(113) 18.52 17.03 4.126E-04 .0084 4.982E-04 .0101 5.555E-04 .0113 1.756E-04  
 LS AS23(113) 18.52 17.03 4.126E-04 .0084 4.982E-04 .0101 5.555E-04 .0113 1.756E-04  
 US AS23(113) 18.55 17.04 4.123E-04 .0084 4.979E-04 .0101 5.551E-04 .0113 1.754E-04

Group 37  
7505  
No

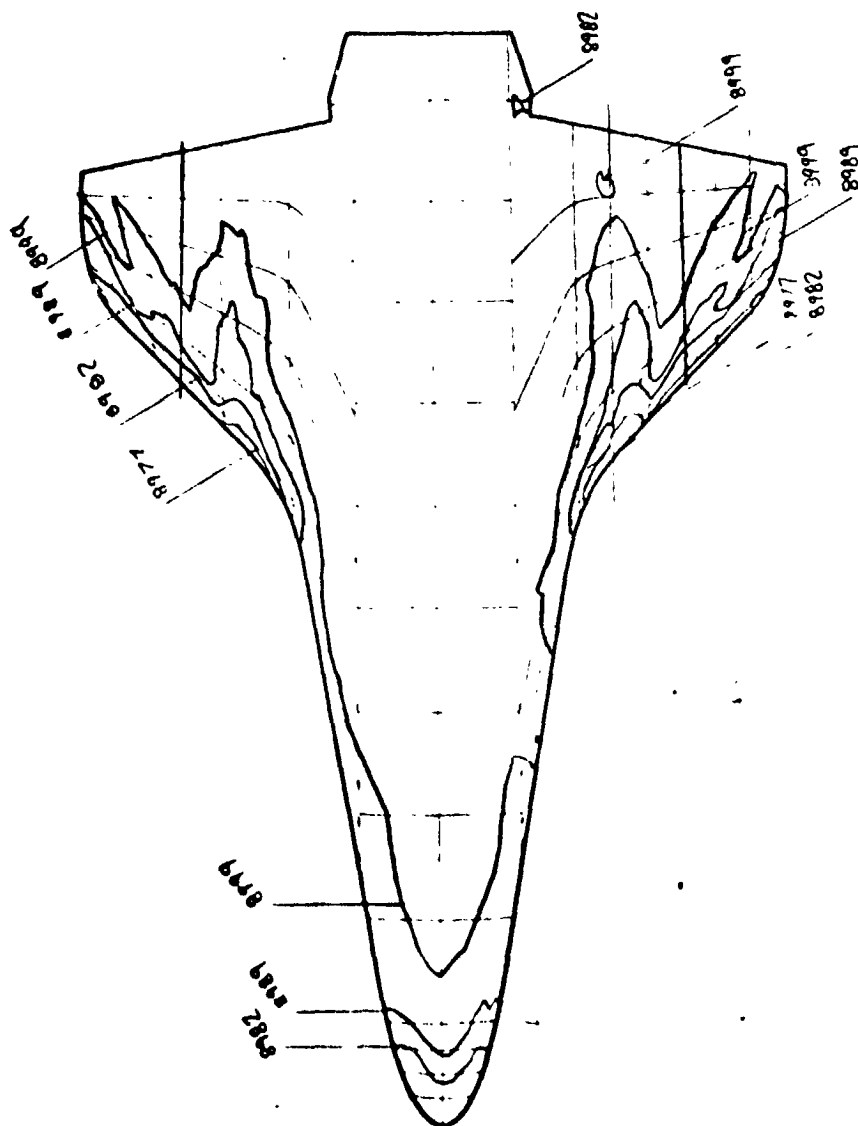
4528  
 $\alpha = 30^\circ$   
 $\phi = 0^\circ$



279

Group 37  
7420  
no

8595  
 $\alpha = 30^\circ$   
 $\phi = 0^\circ$



280.

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7/ 773

AEDC(LAN-INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL R

NASA-RJ ORBITER HEATING

VA249

GROUP COMF16 MODEL MACH NO PO (PSIA) TO (DEG R) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREBEND ROLL-MODEL YAW  
 37 2 ORBITER S 7.91 109.0 1250 30.00 .00 -30.00 -180.00 -.00

T-1AF P-1NF Q-1NF R-1NF MU-1NF RU-1NF RF/FT MREF STREF  
 (DEG R) (PSIA) (FT/SEC) (SLUGS/FT<sup>3</sup>) (LB-SEC/FT<sup>2</sup>) (FT-1) (R=.0175FT) (R=.0175FT)  
 925 .012 .526 3727 1.090E-05 7.445E-08 5.459E 05 1.770E-02 5.499E-02

CAMERA ROLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHOXCKX) TRAR(TO) BETAI(TO)

TOP(T) 7420  
 SIDE(S) 7425  
 BOTTOM(B) 7505

PIC NO TIME DELTIME H(TO) M(TO)/MREF H(.9TO)/MREF H(.85TO) W(.85TO)/MREF ST(TO)

T 8974(200) 1.18 MODEL HAS NOT REACHED CENTERLINE  
 S 2685(200) 1.18 MODEL HAS NOT REACHED CENTERLINE  
 M 4891(200) 1.18 MODEL HAS NOT REACHED CENTERLINE  
 T 8975(200) 2.25 MODEL HAS NOT REACHED CENTERLINE  
 S 2686(200) 2.25 MODEL HAS NOT REACHED CENTERLINE  
 M 4892(200) 2.25 MODEL HAS NOT REACHED CENTERLINE

INJECT TIME = 2.28

T 8976(200) 3.20 DATA NOT YET VALID

M 4893(200) 3.20 DATA NOT YET VALID

S 2687(200) 3.23 DATA NOT YET VALID

T 8977(200) 4.28 DATA NOT YET VALID

S 2688(200) 4.28 DATA NOT YET VALID

M 4894(200) 4.28 DATA NOT YET VALID

T 8978(200) 5.43 4.15 4.446E-03 .2535 5.641E-03 .3187 6.473E-03 .3658 1.376E-02

S 2689(200) 5.46 4.14 4.473E-03 .2528 5.624E-03 .3178 6.453E-03 .3647 1.372E-02

M 4895(200) 5.46 4.14 4.473E-03 .2528 5.624E-03 .3178 6.453E-03 .3647 1.372E-02

T 8979(200) 6.51 5.23 7.944E-03 .2259 5.027E-03 .2840 5.764E-03 .3259 1.226E-02

S 2690(200) 6.51 5.23 7.944E-03 .2259 5.027E-03 .2840 5.764E-03 .3259 1.226E-02

M 4896(200) 6.53 5.24 7.944E-03 .2254 5.015E-03 .2834 5.755E-03 .3252 1.224E-02

T 8980(200) 7.28 6.31 7.641E-03 .2057 4.578E-03 .2587 5.253E-03 .2968 1.117E-02

S 2691(200) 7.28 6.31 7.641E-03 .2057 4.578E-03 .2587 5.253E-03 .2968 1.117E-02

M 4897(200) 7.58 6.31 7.641E-03 .2057 4.578E-03 .2587 5.253E-03 .2968 1.117E-02

T 8981(200) 8.63 7.34 7.371E-03 .1905 4.238E-03 .2395 4.863E-03 .2748 1.034E-02

S 2692(200) 8.66 7.34 7.371E-03 .1901 4.231E-03 .2391 4.855E-03 .2743 1.032E-02

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MASA-PI ORBITER HEATING

AECC(ARO-TAC-) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL A

VA289

GROUP CONFIG MODEL MACH NO P0(P5IA) IO(IEG R) ALPHA-MODEL ALPHA-SECTION ALPHA-PREBEND ROLL-MODEL YAW  
 37 2 0REITER S 7.91 109.0 1250 30.00 .00 -30.00 -100.00 -.00

T-INF P-INF Q-INF V-INF MU-INF RF/FT HREF STREF  
 (DEG R) (PSIA) (PSIA) (FT/SEC) (SLUGS/FT3) (LB-SEC/FT3) (FT-1) (R=.0175FT) (R=.0175FT)  
 97.5 .012 .526 3727 1.000E-05 7.445E-08 5.459E 05 1.770E-02 5.49E-02

CAMFRA ROLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHOXCKX) TBAR(TO) BETA(TO)  
 TOP(T) 7420 78  
 SIG(T) 7425  
 BOTTOM(B) 7505 .0519 1.714E-01 1.7615E-01

PIC NO	TIME RELTIME	H(TO)	H(TO)/HREF	H(.9TO)	H(.9TO)/HREF	H(.85TO)	H(.85TO)/HREF	ST(TO)
T 9982(200)	9.71 8.43	3.148E-03	.1779	3.958E-03	.2237	4.542E-03	.2567	9.658E-03
S 2593(200)	9.71 8.43	3.148E-03	.1779	3.958E-03	.2237	4.542E-03	.2567	9.658E-03
R 4994(200)	9.71 8.43	3.148E-03	.1779	3.958E-03	.2237	4.542E-03	.2567	9.658E-03
T 8083(200)	10.79 9.51	2.965E-03	.1675	3.724E-03	.2106	4.277E-03	.2417	9.095E-03
S 2694(200)	10.79 9.51	2.965E-03	.1675	3.724E-03	.2106	4.277E-03	.2417	9.095E-03
M 4900(200)	10.79 9.51	2.965E-03	.1675	3.724E-03	.2106	4.277E-03	.2417	9.095E-03
T 8984(200)	11.64 10.54	2.813E-03	.1590	3.537E-03	.1999	4.053E-03	.2294	8.630E-03
M 4901(200)	11.64 10.54	2.813E-03	.1590	3.537E-03	.1999	4.053E-03	.2294	8.630E-03
S 2695(200)	11.66 10.54	2.810E-03	.1588	3.533E-03	.1996	4.054E-03	.2291	8.620E-03
T 8985(200)	12.91 11.64	2.600E-03	.1514	3.370E-03	.1904	3.867E-03	.2185	8.222E-03
S 2696(200)	12.91 11.64	2.600E-03	.1514	3.370E-03	.1904	3.867E-03	.2185	8.222E-03
M 4902(200)	12.91 11.64	2.600E-03	.1514	3.370E-03	.1904	3.867E-03	.2185	8.222E-03
T 8986(200)	13.59 12.71	2.564E-03	.1499	3.227E-03	.1823	3.703E-03	.2092	7.874E-03
S 2697(200)	13.59 12.71	2.564E-03	.1499	3.227E-03	.1823	3.703E-03	.2092	7.874E-03
M 4903(200)	13.59 12.71	2.564E-03	.1499	3.227E-03	.1823	3.703E-03	.2092	7.874E-03
T 8987(200)	15.04 13.74	2.444E-03	.1392	3.088E-03	.1751	3.553E-03	.2009	7.560E-03
S 2698(200)	15.04 13.74	2.444E-03	.1392	3.088E-03	.1751	3.553E-03	.2009	7.560E-03
M 4904(200)	15.07 13.74	2.442E-03	.1391	3.085E-03	.1749	3.552E-03	.2007	7.553E-03
T 8988(200)	15.07 13.74	2.442E-03	.1391	3.085E-03	.1749	3.552E-03	.2007	7.553E-03
S 2699(200)	16.12 14.84	2.373E-03	.1341	2.944E-03	.1686	3.424E-03	.1935	7.280E-03
M 4905(200)	16.12 14.84	2.373E-03	.1341	2.944E-03	.1686	3.424E-03	.1935	7.280E-03
T 8989(200)	17.17 15.89	2.243E-03	.1296	2.833E-03	.1629	3.309E-03	.1870	7.035E-03
S 2700(200)	17.17 15.89	2.243E-03	.1296	2.833E-03	.1629	3.309E-03	.1870	7.035E-03
M 4906(200)	17.19 15.92	2.242E-03	.1295	2.831E-03	.1628	3.304E-03	.1868	7.030E-03
T 8990(200)	18.25 16.97	2.219E-03	.1254	2.790E-03	.1577	3.202E-03	.1809	6.809E-03
S 2701(200)	18.25 16.97	2.219E-03	.1254	2.790E-03	.1577	3.202E-03	.1809	6.809E-03
M 4907(200)	18.25 16.97	2.219E-03	.1254	2.790E-03	.1577	3.202E-03	.1809	6.809E-03

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AEDC(ARO, INC.) ARNOLD AFB, TENNESSEE  
VON KARMAN GAS DYNAMICS FACILITY  
50 INCH HYPERSONIC TUNNEL R

NASA-RI ORBITER HEATING

VA209

GROUP CNMF16 MODEL MACH NO PO(PSTIA) TO(DEC R) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREEMO ROLL-MODEL YAW  
37 2 0REITER S 7.91 109.0 1250 30.00 .00 -30.00 -180.00 -5.00  
T-INF P-INF Q-INF V-INF RMQ-INF MU-INF RF/FT HREF STREF  
(DEC R) (PSTIA) (FT/SEC) (SLUGS/FT) (LH-SEC/FT) (FT-1) (R= .0175FT) (M= .0175FT)  
97.5 .012 .526 3727 1.000E-05 7.445E-08 5.459E 05 1.770E-02 5.498E-02

CAMERA ROLL NO PAINT IFMP (DEC F) INITIAL TEMP (DEC F) SQUARE ROOT (RHOXCAK) TBARITO) BETAITO)  
TOPIT) 7420 74 0.519 1.714E-01 1.7615E-01  
SIDE(S) 7425  
BOTTOM(9) 7505

PIC NO	TIME DELTIME	HI(TO)	HI(TO)/HREF	HI(.9TO)	HI(.9TO)/HREF	HI(.85TO)	HI(.85TO)/HREF	ST(TO)
T 999012001	27.86	1.773F-03	.1002	2.230E-03	.1240	2.558E-03	.1446	5.440E-03
S 271012001	27.86	1.773F-03	.1002	2.230E-03	.1240	2.558E-03	.1446	5.440E-03
T 900012001	28.51	1.739F-03	.0943	2.187E-03	.1236	2.509E-03	.1418	5.335E-03
M 691712001	28.51	1.739F-03	.0943	2.187E-03	.1236	2.509E-03	.1418	5.335E-03
S 271112001	28.53	1.739F-03	.0942	2.186E-03	.1235	2.508E-03	.1417	5.333E-03
T 900112001	29.58	1.706F-03	.0964	2.145E-03	.1212	2.462E-03	.1391	5.235E-03
S 271212001	29.58	1.706F-03	.0964	2.145E-03	.1212	2.462E-03	.1391	5.235E-03
M 691412001	29.58	1.706F-03	.0964	2.145E-03	.1212	2.462E-03	.1391	5.235E-03
T 900212001	31.04	1.675F-03	.0947	2.107E-03	.1191	2.418E-03	.1366	5.141E-03
S 271312001	31.06	1.675F-03	.0947	2.106E-03	.1190	2.417E-03	.1366	5.139E-03
T 900312001	32.11	1.646F-03	.0930	2.070E-03	.1170	2.375E-03	.1342	5.051E-03
M 692012001	32.11	1.646F-03	.0930	2.070E-03	.1170	2.375E-03	.1342	5.051E-03
S 271412001	32.14	1.618F-03	.0915	2.035E-03	.1150	2.335E-03	.1319	4.965E-03
T 900412001	33.19	1.618F-03	.0915	2.035E-03	.1150	2.335E-03	.1319	4.965E-03
S 271512001	33.19	1.618F-03	.0915	2.035E-03	.1150	2.335E-03	.1319	4.965E-03
M 692112001	33.19	1.618F-03	.0915	2.035E-03	.1150	2.335E-03	.1319	4.965E-03
T 900512001	34.24	1.542F-03	.0900	2.002E-03	.1131	2.297E-03	.1298	4.885E-03
S 402212001	34.24	1.542F-03	.0900	2.002E-03	.1131	2.297E-03	.1298	4.885E-03
M 692312001	34.26	1.542F-03	.0899	2.001E-03	.1131	2.297E-03	.1298	4.883E-03
T 900612001	35.32	1.542F-03	.0895	1.970E-03	.1113	2.261E-03	.1278	4.807E-03
M 692412001	35.32	1.542F-03	.0895	1.970E-03	.1113	2.261E-03	.1278	4.807E-03
S 271712001	35.24	1.546F-03	.0945	1.940E-03	.1113	2.260E-03	.1277	4.805E-03
T 900712001	36.39	1.543F-03	.0972	1.940E-03	.1096	2.226E-03	.1258	4.733E-03
M 692512001	36.39	1.543F-03	.0972	1.940E-03	.1096	2.226E-03	.1258	4.733E-03
S 271812001	36.39	1.543F-03	.0972	1.940E-03	.1096	2.226E-03	.1258	4.733E-03
M 692612001	36.39	1.543F-03	.0972	1.940E-03	.1096	2.226E-03	.1258	4.733E-03

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NASA-RI AIRCRAFT PEATING

AEDC(ARO,INC.) ARNOLD AFS, TENNESSEE  
VON KARMAN GAS DYNAMICS FACILITY  
50 INCH HYPERSONIC TUNNEL R

VA2R9

GROUP	CONF	MODEL	MACH NO	PR(PISA)	TO(DEC R)	ALPHA-MODEL	ALPHA-SECTOR	ALPHA-PREBEND	ROLL-MODEL	YAW
37	2	ORBITER S	7.91	109.0	1250	30.00	.00	-30.00	-180.00	-.00
T-INF	P-INF	Q-INF	V-INF	RW-INF	WU-INF	RE/FT	MREF	SIREF		
(DEC R)	(PISA)	(FT/SEC)	(SLINGS/FT)	(LM-SEC/FT)	(FT-1)	(R=)	(R=)	(R=)		
92.5	.912	.526	3727	1.490E-05	7.445E-08	5.459E 05	1.770E-02	5.494E-02		
CAMERA	ROLL NO	PAINT TEMP (DEC F)	INITIAL TEMP (DEC F)	SQUARE ROOT (RHOXCHK)	TRAR(TO)	BETA(TO)				
TOPIT)	7420									
SIDE(S)	7425									
MOTTC(M)	7505									

PIC NO	TIME	MELTIME	M(TO)	M(TO)/MREF	M(.9TO)	M(.9TO)/MREF	M(.85TO)	M(.85TO)/MREF	ST(TO)
M 4925(200)	30.27	36.99	1.503E-03	.0849	1.890E-03	.1068	2.169E-03	.1225	4.611E-03
Y 9080(200)	30.29	37.02	1.503E-03	.0849	1.890E-03	.1068	2.169E-03	.1225	4.610E-03
S 2719(200)	30.29	37.02	1.503E-03	.0849	1.890E-03	.1068	2.169E-03	.1225	4.610E-03
-T 9080(200)	40.32	39.04	1.463E-03	.0827	1.840E-03	.1039	2.111E-03	.1193	4.408E-03
-S 2720(200)	40.32	39.04	1.463E-03	.0827	1.840E-03	.1039	2.111E-03	.1193	4.408E-03
-M 4926(200)	40.32	39.04	1.463E-03	.0827	1.840E-03	.1039	2.111E-03	.1193	4.408E-03

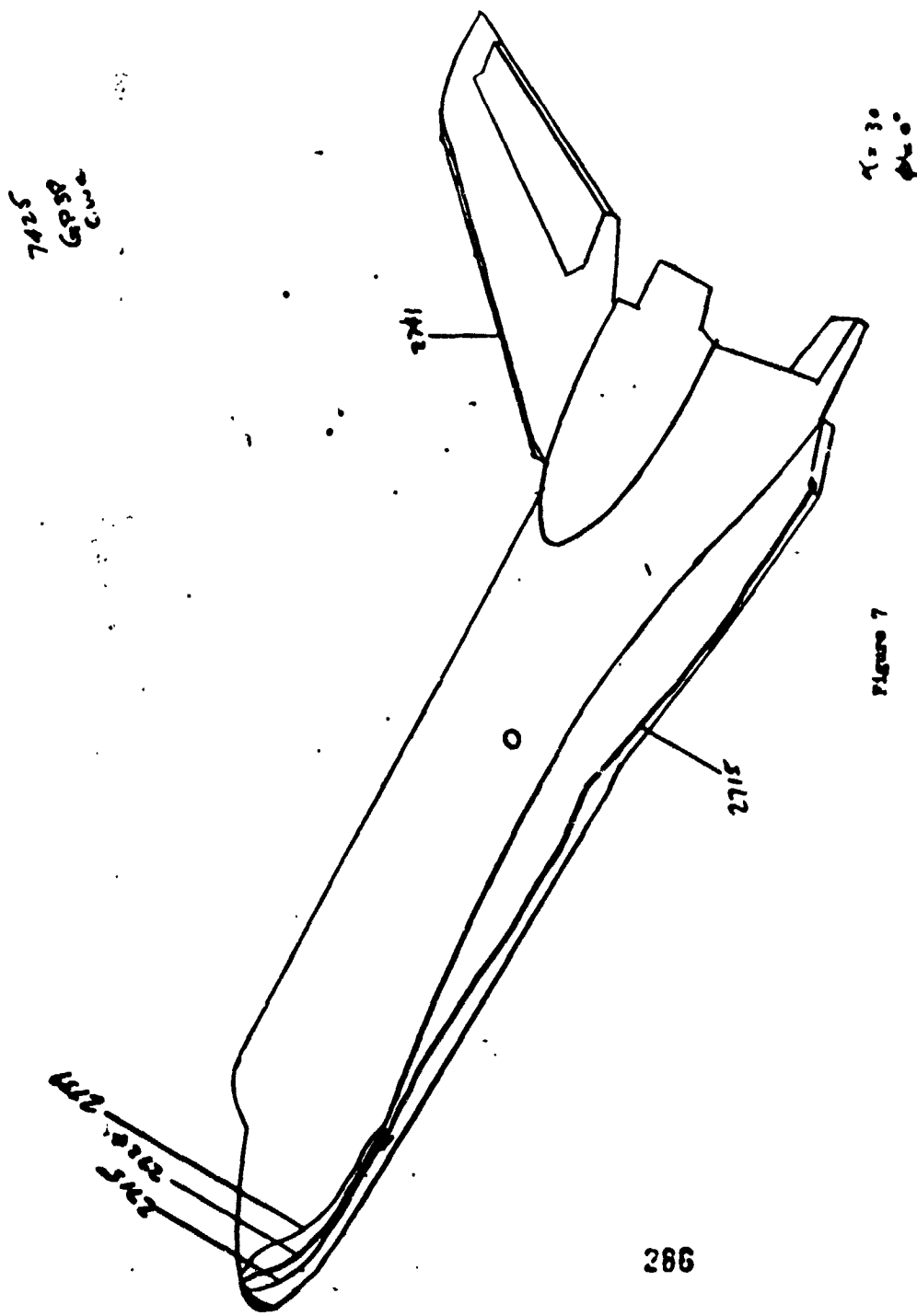


Figure 7

Group 88  
7505

46

4528  
 $\alpha = 30^\circ$   
 $\phi = 0^\circ$

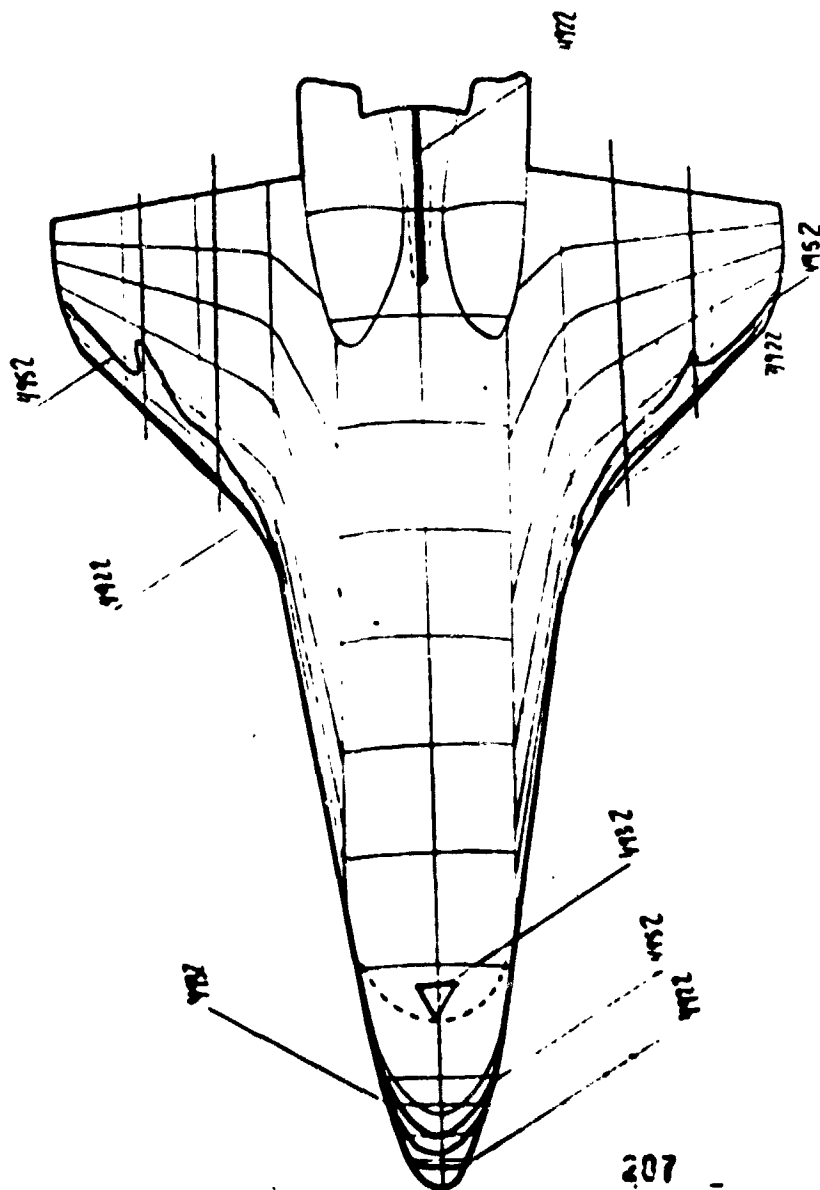


Figure 8

Group 38  
7420  
MD

8595  
 $\alpha = 30^\circ$   
 $\phi = 0^\circ$

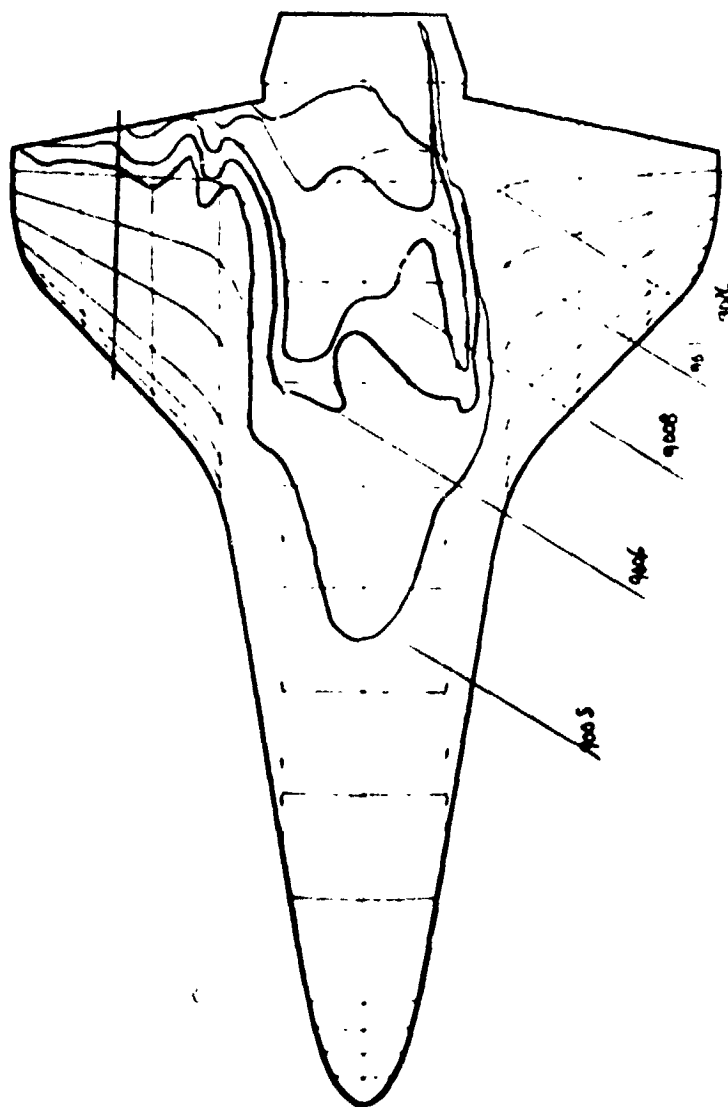


Figure 9

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NASA-RJ ORBITER HEATING

AEDC(ARO, INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL R

VA289

GROUP CONFIG MODEL MACH NO PO(P-1A) TO(LEG R) ALPHA-MODEL ALPHA-SECTION ALPHA-PREBEND ROLL-MODEL YAW  
 3P 2 ORBITER S 7.91 110.3 1241 30.00 .00 -30.00 -180.00 -.00

T-INF P-INF Q-INF V-INF PHO-INF MU-INF RE/FT MREF STREF  
 (DEG R) (PSIA) (FT/SEC) (SLUGS/FT<sup>2</sup>) (LH-SEC/FT<sup>2</sup>) (FT-1) (R=.0175FT) (R=.0175FT)

91.9 .012 .532 3715 1-110E-05 7.396E-08 5.575E 05 1.777E-02 5.445E-02

CAMERA HOLL NO PAINT IFMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHO/CAK) TRAR(TO) BETA(TO)

TOP(T) 7420 113 78 .0475 4.975E-02 4.5919E-02  
 SIDE(S) 7425  
 BOTTOM(B) 7505

PIC NO	TIME RELTIME	H(TO)	H(TO)/HREF	M(.910)	M(.910)/HREF	M(.912TO)	M(.912TO)/HREF	ST(TO)
T 9010(113)	10.79 9.51	7.073E-04	.0398	P.660E-04	.0487	8.422E-04	.0474	2.150E-03
S 2721(113)	10.79 9.51	7.073E-04	.0398	P.660E-04	.0487	8.422E-04	.0474	2.150E-03
M 4927(113)	10.79 9.51	7.073E-04	.0398	P.660E-04	.0487	8.422E-04	.0474	2.150E-03
T 9011(113)	11.84 10.54	6.712E-04	.0377	P.218E-04	.0462	7.992E-04	.0449	2.038E-03
S 2722(113)	11.84 10.54	6.712E-04	.0377	P.218E-04	.0462	7.992E-04	.0449	2.038E-03
M 4928(113)	11.84 10.54	6.712E-04	.0377	P.218E-04	.0462	7.992E-04	.0449	2.038E-03
T 9012(113)	12.91 11.64	6.304E-04	.0359	7.928E-04	.0440	7.613E-04	.0428	1.940E-03
S 2723(113)	12.91 11.64	6.304E-04	.0359	7.928E-04	.0440	7.613E-04	.0428	1.940E-03
M 4929(113)	12.91 11.64	6.304E-04	.0359	7.928E-04	.0440	7.613E-04	.0428	1.940E-03
T 9013(113)	13.57 12.69	6.124E-04	.0344	7.490E-04	.0421	7.291E-04	.0410	1.856E-03
S 2724(113)	13.57 12.69	6.124E-04	.0344	7.490E-04	.0421	7.291E-04	.0410	1.856E-03
M 4930(113)	13.57 12.69	6.124E-04	.0344	7.490E-04	.0421	7.291E-04	.0410	1.856E-03
T 9014(113)	15.04 13.74	5.874E-04	.0330	7.191E-04	.0405	7.000E-04	.0393	1.784E-03
S 2725(113)	15.04 13.74	5.874E-04	.0330	7.191E-04	.0405	7.000E-04	.0393	1.784E-03
M 4931(113)	15.04 13.74	5.874E-04	.0330	7.191E-04	.0405	7.000E-04	.0393	1.784E-03
T 9015(113)	16.12 14.84	5.662E-04	.0318	6.932E-04	.0389	6.742E-04	.0379	1.715E-03
S 2726(113)	16.12 14.84	5.662E-04	.0318	6.932E-04	.0389	6.742E-04	.0379	1.715E-03
M 4932(113)	16.12 14.84	5.662E-04	.0318	6.932E-04	.0389	6.742E-04	.0379	1.715E-03
T 9016(113)	17.17 15.89	5.472E-04	.0307	6.499E-04	.0376	6.515E-04	.0366	1.657E-03
S 2727(113)	17.17 15.89	5.472E-04	.0307	6.499E-04	.0376	6.515E-04	.0366	1.657E-03
M 4933(113)	17.17 15.89	5.472E-04	.0307	6.499E-04	.0376	6.515E-04	.0366	1.657E-03
T 9017(113)	18.25 16.97	5.245E-04	.0297	6.483E-04	.0364	6.305E-04	.0354	1.604E-03
S 2728(113)	18.25 16.97	5.245E-04	.0297	6.483E-04	.0364	6.305E-04	.0354	1.604E-03
M 4934(113)	18.25 16.97	5.245E-04	.0297	6.483E-04	.0364	6.305E-04	.0354	1.604E-03
T 9018(113)	19.20 18.02	5.138E-04	.0288	6.291E-04	.0353	6.118E-04	.0343	1.555E-03

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AFDC(ARO-INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL R

NASA-RI ORBITER HEATING

VA289

GROUP COMPTB MODEL MACH NO P(PSIA) T(DEG R) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREBEND ROLL-MODEL YAW  
 3A 2 ORBITER S 7.91 110.8 1242 30.00 .00 -30.00 -180.00 --.00

T-1AF P-INF Q-INF V-INF W-INF MU-INF RU-INF RF/FT MREF SINEF  
 (DEG R) (PSIA) (PSIA) (PSIA) (SLUGS/FT) (LB-SEC/FT) (EI-1) (R= .0175FT) (R= .0175FT)  
 91.9 .012 .535 3715 7.347E-08 5.599E 05 1.782E-02 5.434E-02

CAMERA ROLL NO P-INT (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHOXCK) TRAR(TO) BETA(TO)

TOP(T) 7420  
 SIDE(S) 7425  
 BOTTOM(B) 7505

.0475

4.975E-02 4.5919E-02

PTC NO	TIME	DELTIME	M(TO)	M(TO)/MREF	M(.910)	M(.910)/MREF	M(.912)	M(.912)/MREF	ST(TO)
S 2729(113)	19.22	18.04	5.135E-04	.0288	6.287E-04	.0353	6.114E-04	.0343	1.555E-03
M 4935(113)	19.22	18.04	5.135E-04	.0288	6.287E-04	.0353	6.114E-04	.0343	1.555E-03
I 9019(113)	20.27	19.09	4.992E-04	.0280	6.111E-04	.0343	5.943E-04	.0334	1.512E-03
M 4936(113)	20.27	19.09	4.992E-04	.0280	6.111E-04	.0343	5.943E-04	.0334	1.512E-03
S 2730(113)	20.40	19.12	4.948E-04	.0280	6.107E-04	.0343	5.939E-04	.0333	1.509E-03
I 9020(113)	21.45	20.17	4.857E-04	.0273	5.946E-04	.0334	5.782E-04	.0325	1.470E-03
M 4937(113)	21.45	20.17	4.857E-04	.0273	5.946E-04	.0334	5.782E-04	.0325	1.470E-03
S 2731(113)	21.45	20.17	4.857E-04	.0273	5.946E-04	.0334	5.782E-04	.0325	1.470E-03
M 4938(113)	22.50	21.22	4.735E-04	.0264	5.797E-04	.0325	5.637E-04	.0316	1.431E-03
I 9021(113)	22.53	21.25	4.732E-04	.0264	5.793E-04	.0325	5.634E-04	.0316	1.432E-03
M 4939(113)	22.53	21.25	4.732E-04	.0264	5.793E-04	.0325	5.634E-04	.0316	1.432E-03
S 2732(113)	23.50	22.30	4.619E-04	.0259	5.655E-04	.0318	5.500E-04	.0309	1.399E-03
M 4940(113)	23.50	22.30	4.619E-04	.0259	5.655E-04	.0318	5.500E-04	.0309	1.399E-03
I 9022(113)	23.50	22.30	4.619E-04	.0259	5.655E-04	.0318	5.500E-04	.0309	1.399E-03
M 4941(113)	23.50	22.30	4.619E-04	.0259	5.655E-04	.0318	5.500E-04	.0309	1.399E-03
S 2733(113)	24.65	23.37	4.511E-04	.0253	5.523E-04	.0310	5.372E-04	.0301	1.364E-03
M 4942(113)	24.65	23.37	4.511E-04	.0253	5.523E-04	.0310	5.372E-04	.0301	1.364E-03
I 9023(113)	24.65	23.37	4.511E-04	.0253	5.523E-04	.0310	5.372E-04	.0301	1.364E-03
M 4943(113)	24.65	23.37	4.511E-04	.0253	5.523E-04	.0310	5.372E-04	.0301	1.364E-03
S 2734(113)	25.70	24.42	4.413E-04	.0248	5.403E-04	.0303	5.255E-04	.0295	1.333E-03
M 4944(113)	25.70	24.42	4.413E-04	.0248	5.403E-04	.0303	5.255E-04	.0295	1.333E-03
I 9024(113)	25.70	24.42	4.413E-04	.0248	5.403E-04	.0303	5.255E-04	.0295	1.333E-03
M 4945(113)	25.70	24.42	4.413E-04	.0248	5.403E-04	.0303	5.255E-04	.0295	1.333E-03
S 2735(113)	26.78	25.50	4.319E-04	.0242	5.288E-04	.0297	5.143E-04	.0288	1.305E-03
M 4946(113)	26.78	25.50	4.319E-04	.0242	5.288E-04	.0297	5.143E-04	.0288	1.305E-03
I 9025(113)	26.78	25.50	4.319E-04	.0242	5.288E-04	.0297	5.143E-04	.0288	1.305E-03
M 4947(113)	26.78	25.50	4.319E-04	.0242	5.288E-04	.0297	5.143E-04	.0288	1.305E-03
S 2736(113)	27.83	26.55	4.231E-04	.0237	5.182E-04	.0290	5.040E-04	.0283	1.277E-03
M 4948(113)	27.83	26.55	4.231E-04	.0237	5.182E-04	.0290	5.040E-04	.0283	1.277E-03
I 9026(113)	27.83	26.55	4.231E-04	.0237	5.182E-04	.0290	5.040E-04	.0283	1.277E-03
M 4949(113)	27.83	26.55	4.231E-04	.0237	5.182E-04	.0290	5.040E-04	.0283	1.277E-03

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MASA-RJ ORBITER HEATING AEDC(440-INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL R

YA249

GROUP CONFIG MODEL MACH NO ORIP(SIA) TO(DEC R) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREBEND ROLL-MODEL YAW  
 3A 2 0REITER S 7.91 111.0 1241 30.00 .00 -30.00 -120.00 -.00  
 T-INF P-INF U-INF V-INF W-INF W/F/T MREF STREF  
 (DEG R) (PSIA) (PSIA) (FT/SEC) (SLUGS/FT<sup>3</sup>) (LB-SEC/FT<sup>2</sup>) (F<sub>1</sub>-1) (R<sub>2</sub>-.0175FT) (M=.0175FT)  
 91.9 .012 .536 3715 1.117E-05 7.396E-08 5.411E 05 1.793E-02 5.428E-02

CAMERA HOLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHOQACR) TRAR(TO) RETA(TO)

TOP(1) 7420 78 .0475 4.975E-02 4.5919E-02  
 SIDE(1) 7425  
 BOTTOM(1) 7505

PIC NO	TIME DELT(SEC)	H(TO)	H(TO)/MREF	H(1.910)	H(1.910)/MREF	H(1.912)	H(1.912)/MREF	ST(TO)
1	9.27(113) 28.51 27.65	4.150E-04	.0233	5.080E-04	.0285	4.941E-04	.0277	1.253E-03
M	9.44(113) 28.51 27.65	4.150E-04	.0233	5.080E-04	.0285	4.941E-04	.0277	1.253E-03
S	2.73(113) 24.53 27.65	4.148E-04	.0232	5.078E-04	.0285	4.938E-04	.0277	1.252E-03
T	9.25(113) 28.58 28.71	4.071E-04	.0228	4.994E-04	.0279	4.847E-04	.0272	1.227E-03
S	2.73(113) 24.58 28.71	4.071E-04	.0228	4.994E-04	.0279	4.847E-04	.0272	1.227E-03
M	9.45(113) 28.58 28.71	4.071E-04	.0228	4.994E-04	.0279	4.847E-04	.0272	1.227E-03
M	9.46(113) 31.04 29.74	3.994E-04	.0224	4.895E-04	.0274	4.701E-04	.0267	1.206E-03
T	9.29(113) 31.06 29.74	3.997E-04	.0224	4.893E-04	.0274	4.759E-04	.0267	1.206E-03
S	2.74(113) 31.06 29.74	3.997E-04	.0224	4.893E-04	.0274	4.759E-04	.0267	1.206E-03
T	9.33(113) 32.11 30.83	3.924E-04	.0220	4.809E-04	.0270	4.677E-04	.0262	1.185E-03
M	9.47(113) 32.11 30.83	3.924E-04	.0220	4.809E-04	.0270	4.677E-04	.0262	1.185E-03
S	2.74(113) 32.11 30.83	3.924E-04	.0220	4.809E-04	.0270	4.677E-04	.0262	1.185E-03
T	9.43(113) 33.19 31.91	3.851E-04	.0216	4.727E-04	.0265	4.597E-04	.0258	1.164E-03
S	2.74(113) 33.19 31.91	3.851E-04	.0216	4.727E-04	.0265	4.597E-04	.0258	1.164E-03
M	9.44(113) 33.19 31.91	3.851E-04	.0216	4.727E-04	.0265	4.597E-04	.0258	1.164E-03
T	9.32(113) 34.24 32.94	3.749E-04	.0213	4.651E-04	.0261	4.524E-04	.0253	1.144E-03
M	9.44(113) 34.24 32.94	3.749E-04	.0213	4.651E-04	.0261	4.524E-04	.0253	1.144E-03
S	2.74(113) 34.24 32.94	3.749E-04	.0213	4.651E-04	.0261	4.524E-04	.0253	1.144E-03
T	9.43(113) 35.32 34.06	3.739E-04	.0209	4.577E-04	.0256	4.451E-04	.0249	1.126E-03
M	9.45(113) 35.32 34.06	3.739E-04	.0209	4.577E-04	.0256	4.451E-04	.0249	1.126E-03
S	2.74(113) 35.32 34.06	3.739E-04	.0209	4.577E-04	.0256	4.451E-04	.0249	1.126E-03
T	9.43(113) 36.29 35.11	3.641E-04	.0206	4.507E-04	.0253	4.383E-04	.0246	1.111E-03
S	2.74(113) 36.29 35.11	3.641E-04	.0206	4.507E-04	.0253	4.383E-04	.0246	1.111E-03
M	9.45(113) 36.29 35.11	3.641E-04	.0206	4.507E-04	.0253	4.383E-04	.0246	1.111E-03
M	9.52(113) 36.27 36.00	3.546E-04	.0201	4.391E-04	.0246	4.270E-04	.0239	1.079E-03

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AEDCIARD, INC.) ANNOLU AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL R

NASA-R1 ORBITER HEATING

VA249

GROUP	CONFID	MODEL	MACH NO	PO(PISA)	TN( DEG P)	ALPHA-MODEL	ALPHA-SECTION	ALPHA-PREBEND	ROLL-MODEL	YAW
34	2	ORBITER S	7.91	111.3	1242	30.00	.00	-30.00	-180.00	-0.00
T-INF	P-INF	Q-INF	V-INF	W-INF	RE/FT	MREF	SINEF			
(DEG H)	(PSIA)	(PSIA)	(FT/SEC)	(SLUGS/FT <sup>3</sup> )	(LB-SEC/FT <sup>2</sup> )	(FI-1)	(R <sub>2</sub> -0175E1)			
91.9	.912	.532	3715	1.121E-05	7.397E-08	5.430E 05	1.746E-02	5.419E-02		
CAMFRA	HOLL NO	PAINT IFMP	(DEG F)	INITIAL TEMP	(DEG F)	SQUARE ROOT	(RHOXCAR)	TBAR(TO)	BETA(TO)	
TOP(T)	7420			78		.0475		4.975E-02	4.5919E-02	
SIN(TS)	7425									
WOLTCM(R)	7505									

PIC NO	TIME	MELTIME	M(TO)	M(TO)/MREF	M(1.9T)	M(1.9T)/MREF	M(1.9T)	M(1.9T)/MREF	ST(TO)
1	9435(1113)	38.29	37.07	4.389E-04	.0246	4.269E-04	.0239	1.080E-03	
2	2740(1113)	38.29	37.02	4.389E-04	.0246	4.269E-04	.0239	1.080E-03	
3	9436(1113)	40.22	39.04	4.274E-04	.0239	4.156E-04	.0233	1.051E-03	
4	2747(1113)	40.22	39.04	4.274E-04	.0239	4.156E-04	.0233	1.051E-03	
5	6653(1113)	40.22	39.04	4.274E-04	.0239	4.156E-04	.0233	1.051E-03	

Group 39  
750S  
105

4528  
 $\alpha = 30^\circ$   
 $\phi = 0^\circ$

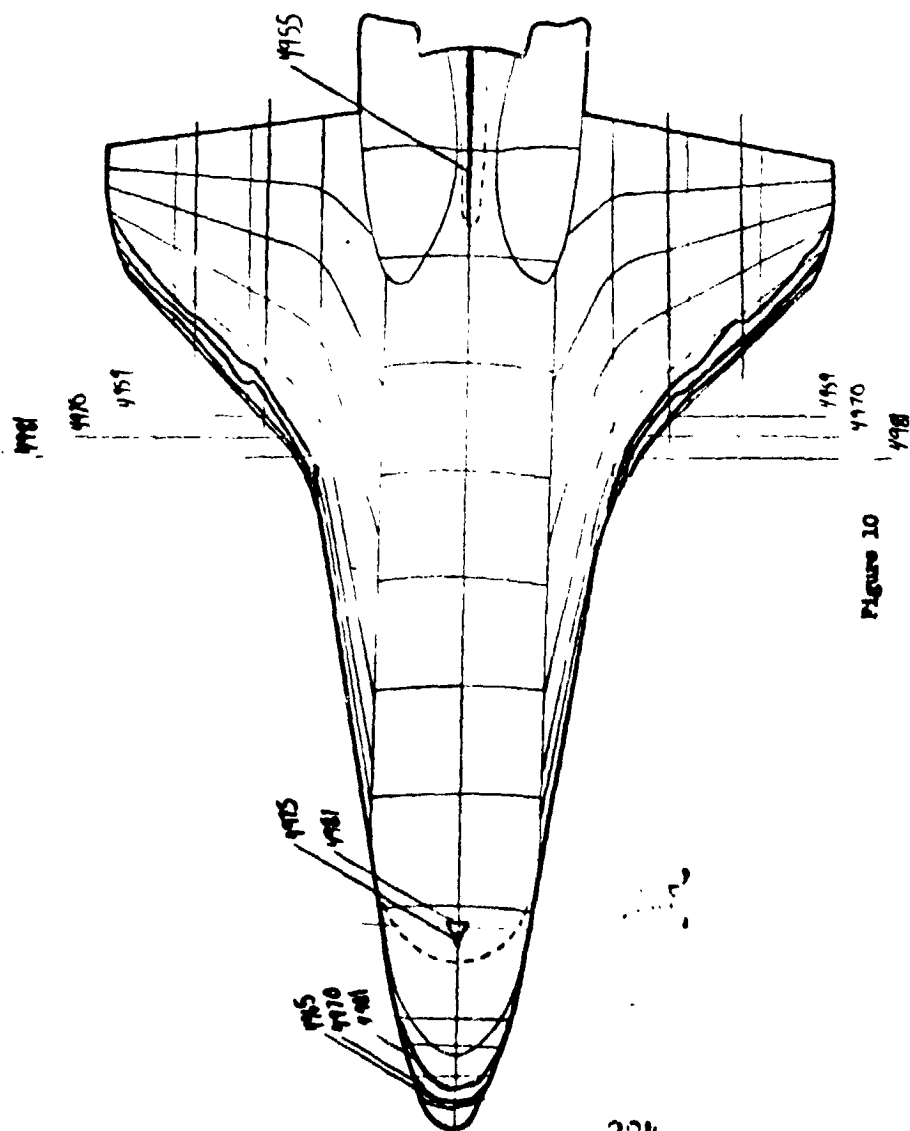
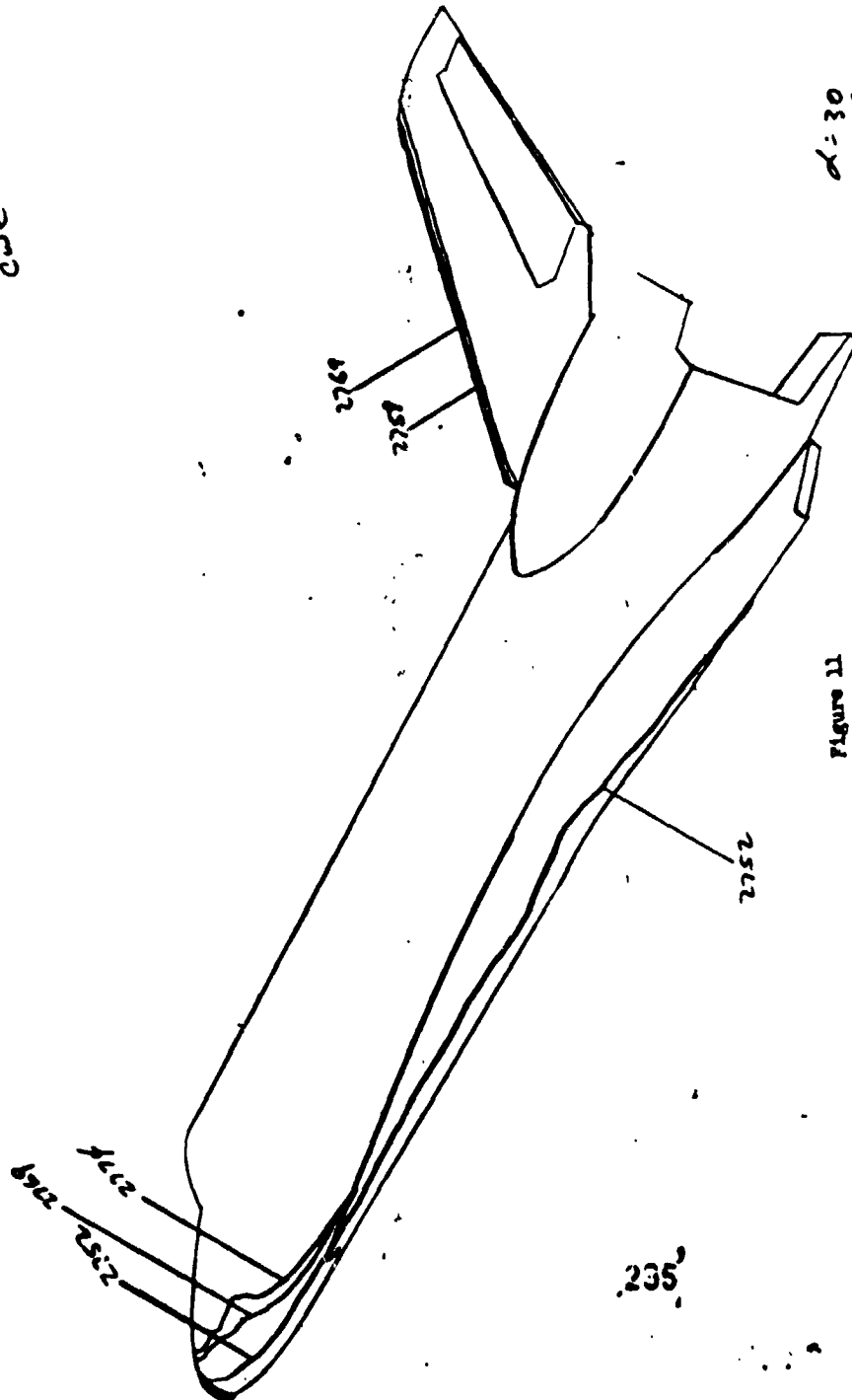


Figure 10

7425  
GP 39  
CWC

$\alpha = 30^\circ$   
 $\phi = 0$



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NASA-R1 ORBITER HEATING  
 VA249  
 AED(AMO, INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL R

GROUP CONFIG MODEL MACH NO PO(PSIA) TO( DEG R) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREREND ROLL-MODEL YAW  
 39 4 ORBITER 63 7.91 111.2 1243 29.99 .01 -30.00 -100.00 -.00  
 T-INF P-INF Q-INF V-INF MU-INF MU-INF RE/FT MREF STREF  
 (DEG R) (PSIA) (PSIA) (ET/SEC) (SLUGS/FT<sup>3</sup>) (LB-SEC/FT<sup>2</sup>) (ET-11 (R<sub>2</sub> -0.175EI) (R<sub>2</sub> -0.175EI)  
 92.0 -.012 .537 3717 1.119F-05 7.405E-08 5.415E 05 1.786E-02 5.425E-02  
 CAMERA ROLL NO PAINT IFWD (DEG F) SQUARE ROOT (RHO/CAK) TRAR(ITO) BETA(ITO)  
 TOP(IT) 7420  
 SIDE(S) 7425  
 BOTTOM(B) 7505  
 131 78 .0484 7.517E-02 7.0810E-02

PTC NO TIME RELTIME MU(TO) MREF MU(TO)/MREF MU(.91TO) MU(.912TO) MU(.912TO)/MREF ST(ITO)  
 S 2756(131) 9.74 8.47 1.182E-03 .0661 1.458E-03 .0814 1.415E-03 .0792 3.554E-03  
 T 4646(131) 10.79 9.49 1.115E-03 .0624 1.373E-03 .0744 1.335E-03 .0747 3.352E-03  
 S 2757(131) 10.79 9.52 1.115E-03 .0624 1.373E-03 .0744 1.335E-03 .0747 3.352E-03  
 M 4663(131) 10.79 9.52 1.115E-03 .0624 1.373E-03 .0744 1.335E-03 .0747 3.352E-03  
 S 2758(131) 11.84 10.57 1.058E-03 .0592 1.303E-03 .0729 1.267E-03 .0708 3.178E-03  
 T 4647(131) 11.86 10.60 1.057E-03 .0592 1.301E-03 .0729 1.265E-03 .0708 3.180E-03  
 M 4664(131) 11.86 10.60 1.057E-03 .0592 1.301E-03 .0729 1.265E-03 .0708 3.180E-03  
 T 4648(131) 12.91 11.45 1.008E-03 .0564 1.241E-03 .0695 1.207E-03 .0676 3.033E-03  
 M 4665(131) 12.91 11.45 1.008E-03 .0564 1.241E-03 .0695 1.207E-03 .0676 3.033E-03  
 S 2759(131) 12.94 11.48 1.007E-03 .0564 1.240E-03 .0694 1.206E-03 .0675 3.030E-03  
 T 4649(131) 13.59 12.74 9.647E-04 .0539 1.184E-03 .0644 1.155E-03 .0646 2.897E-03  
 M 4666(131) 13.59 12.74 9.647E-04 .0539 1.184E-03 .0644 1.155E-03 .0646 2.897E-03  
 S 2760(131) 14.02 12.75 9.637E-04 .0539 1.186E-03 .0644 1.154E-03 .0645 2.897E-03  
 T 4650(131) 15.07 13.80 9.263E-04 .0518 1.140E-03 .0638 1.109E-03 .0620 2.782E-03  
 M 4667(131) 15.07 13.80 9.263E-04 .0518 1.140E-03 .0638 1.109E-03 .0620 2.782E-03  
 S 2761(131) 16.12 14.85 9.929E-04 .0499 1.098E-03 .0614 1.069E-03 .0597 2.679E-03  
 T 4651(131) 16.14 14.88 9.922E-04 .0499 1.098E-03 .0614 1.068E-03 .0598 2.682E-03  
 M 4668(131) 16.14 14.88 9.922E-04 .0499 1.098E-03 .0614 1.068E-03 .0598 2.682E-03  
 S 2762(131) 17.19 15.94 9.622E-04 .0482 1.061E-03 .0594 1.032E-03 .0577 2.592E-03  
 T 4652(131) 17.19 15.94 9.622E-04 .0482 1.061E-03 .0594 1.032E-03 .0577 2.592E-03  
 M 4669(131) 17.19 15.94 9.622E-04 .0482 1.061E-03 .0594 1.032E-03 .0577 2.592E-03  
 S 2763(131) 18.27 17.01 9.345E-04 .0466 1.027E-03 .0574 9.990E-04 .0558 2.504E-03  
 T 4653(131) 18.27 17.01 9.345E-04 .0466 1.027E-03 .0574 9.990E-04 .0558 2.504E-03  
 M 4670(131) 18.27 17.01 9.345E-04 .0466 1.027E-03 .0574 9.990E-04 .0558 2.504E-03

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MASA-HI ORBITER HEATING

AEDCIAPQ-INC.) ARNOLD AFS, TENNESSEE  
VON KARMAN GAS DYNAMICS FACILITY  
50 INCH HYPERSONIC TUNNEL N

VA249

GROUP COMPTE MODEL MACH NO P(PSIA) T(DEG R) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREBEND ROLL-MODEL YAW  
39 6 6REITFM R3 7.91 111.6 1243 29.99 .01 -30.00 -100.00 --0.00

T-1AF P-1NF Q-1NF V-1NF MU-1NF RE/FT MREF STREF  
(DEG R) (PSIA) (PSIA) (FT/SEC) (SLUGS/FT<sup>3</sup>) (LB-SEC/FT<sup>2</sup>) (FT-11 (R=0.175E11 (R=0.175E11  
92.0 .912 .539 371R 1.122E-05 7.407E-06 5.433E 05 1.749E-02 5.416E-02

CAMERA ROLL MU PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RMOCAN) TBAR(TO) BETAITO)  
TOP(T) 7420 78  
SIDF(S) 7425 131  
WOLTCM(R) 7505 .0484 7.517E-02 7.0810E-02

PIC NO	TIME	MELTIME	M(TO)	MREF	M(OTD)	M(OTD)/MREF	M(OTD)/MREF	M(OTD)/MREF	ST(OTD)
1	9054(131)	14.22	14.04	0.0453	9.970E-04	0.0557	9.695E-04	0.0542	2.430E-03
2	9071(131)	14.32	14.04	0.0453	9.970E-04	0.0557	9.695E-04	0.0542	2.430E-03
3	2765(131)	14.25	14.04	0.0453	9.970E-04	0.0557	9.695E-04	0.0542	2.430E-03
4	9055(131)	20.40	14.13	0.0453	9.970E-04	0.0557	9.695E-04	0.0542	2.430E-03
5	9072(131)	20.40	14.13	0.0453	9.970E-04	0.0557	9.695E-04	0.0542	2.430E-03
6	2766(131)	20.42	14.14	0.0453	9.970E-04	0.0557	9.695E-04	0.0542	2.430E-03
7	9056(131)	21.47	20.21	0.0453	9.970E-04	0.0557	9.695E-04	0.0542	2.430E-03
8	2767(131)	21.47	20.21	0.0453	9.970E-04	0.0557	9.695E-04	0.0542	2.430E-03
9	9057(131)	21.47	20.21	0.0453	9.970E-04	0.0557	9.695E-04	0.0542	2.430E-03
10	9073(131)	21.47	20.21	0.0453	9.970E-04	0.0557	9.695E-04	0.0542	2.430E-03
11	2768(131)	23.08	21.41	0.0453	9.970E-04	0.0557	9.695E-04	0.0542	2.430E-03
12	9074(131)	23.08	21.41	0.0453	9.970E-04	0.0557	9.695E-04	0.0542	2.430E-03
13	2769(131)	23.10	21.44	0.0453	9.970E-04	0.0557	9.695E-04	0.0542	2.430E-03
14	9075(131)	25.10	21.46	0.0453	9.970E-04	0.0557	9.695E-04	0.0542	2.430E-03
15	9058(131)	25.13	23.04	0.0453	9.970E-04	0.0557	9.695E-04	0.0542	2.430E-03
16	2770(131)	25.13	23.04	0.0453	9.970E-04	0.0557	9.695E-04	0.0542	2.430E-03
17	9059(131)	25.13	23.04	0.0453	9.970E-04	0.0557	9.695E-04	0.0542	2.430E-03
18	9076(131)	27.16	25.09	0.0453	9.970E-04	0.0557	9.695E-04	0.0542	2.430E-03
19	2771(131)	27.16	25.09	0.0453	9.970E-04	0.0557	9.695E-04	0.0542	2.430E-03
20	9077(131)	27.16	25.09	0.0453	9.970E-04	0.0557	9.695E-04	0.0542	2.430E-03
21	2772(131)	29.18	27.07	0.0453	9.970E-04	0.0557	9.695E-04	0.0542	2.430E-03
22	9078(131)	29.18	27.07	0.0453	9.970E-04	0.0557	9.695E-04	0.0542	2.430E-03
23	2773(131)	31.21	29.06	0.0453	9.970E-04	0.0557	9.695E-04	0.0542	2.430E-03
24	9079(131)	31.21	29.06	0.0453	9.970E-04	0.0557	9.695E-04	0.0542	2.430E-03
25	2774(131)	31.24	29.07	0.0453	9.970E-04	0.0557	9.695E-04	0.0542	2.430E-03
26	9080(131)	33.24	31.07	0.0453	9.970E-04	0.0557	9.695E-04	0.0542	2.430E-03

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3011734 4311000 10-05000

05 12M1 4 3443 1NOSC 12MNO 1 06  
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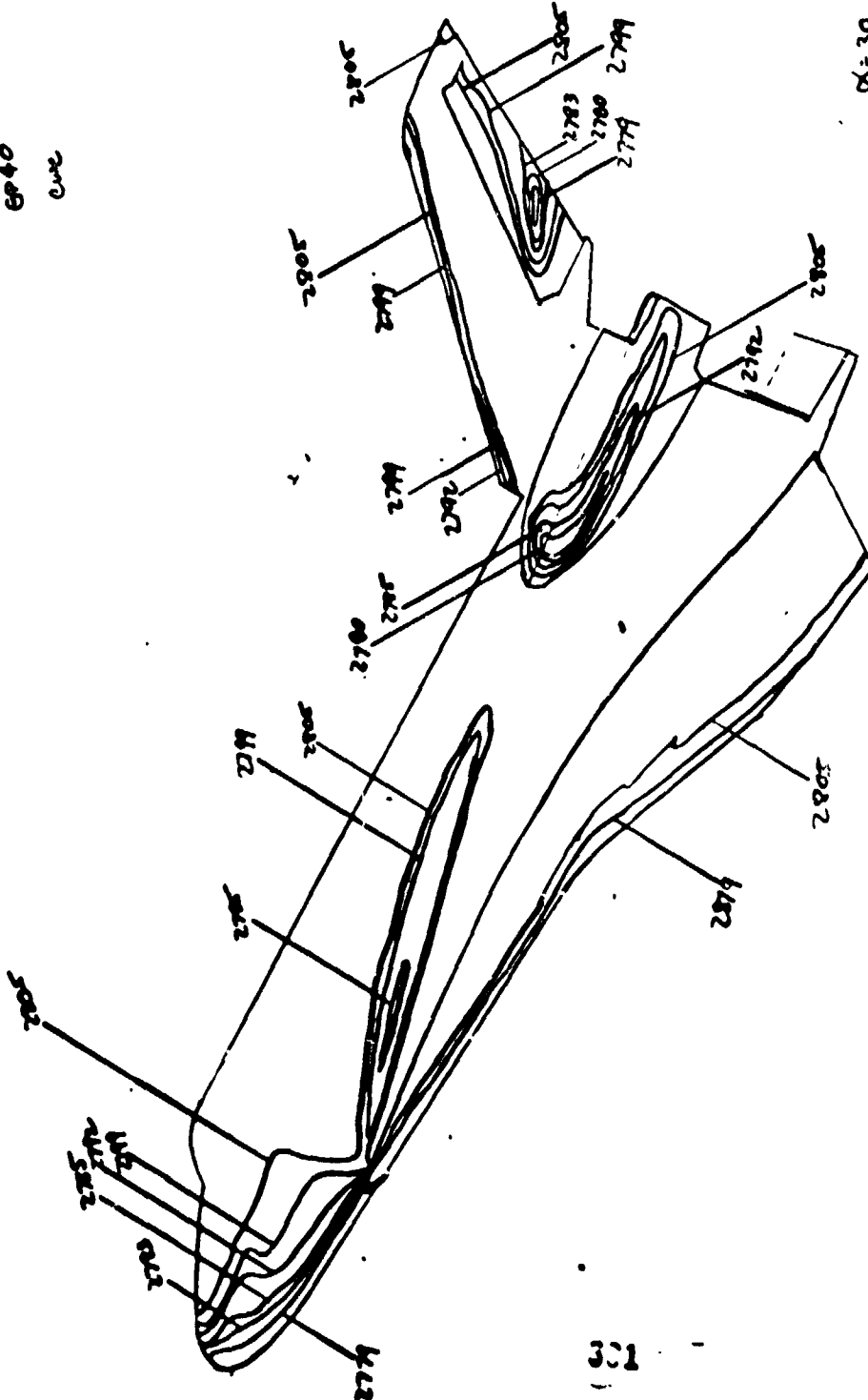
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GROUP	COUNT	MODEL	MACH NO	PO(PSIA)	TO(DEG R)	ALPHA-MODEL	ALPHA-SECTION	ALPHA-PREBEND	ROLL-MODEL	YAW
30	A	CARLITEN M3	7.91	111.0	1244	20.99	.01	-30.00	-100.00	-0.00
32.0	.012	.540	.3714	1.1704E-05	MU=INF	DE/FT	WREF	STREF		
(O4G R)	(O5IA)	(O5IA)	(FT/SEC)	(SLUGS/FT3)	(LM-SEC/FT2)	(FT/FT)	(M=.0175FT)	(M=.0175FT)		
					7.409E-08	5.41E 05	1.701E-02	5.412E-02		

CAMERA	ROLL NO	PAINT	ICWP (DGF F)	INITIAL TEMP (DEG F)	SQUARE HOOT (RHOCKAK)	TRAR(TO)	RETA(TO)
TOP(T)	7420						
SICE(S)	7425	131		78	.0426	.517E-02	7.0810E-02

PIC NO	TYPE	NETLINE	M(TOI)	M(TOI)/MREF	M(.970)	M(.970)/MREF	M(.912TOI)	M(.912TOI)/MREF	ST(TOI)
1	9952(1311)	33.26	32.00	0.960	7.490E-04	0.948	7.283E-04	0.947	1.825E-03
2	9973(1311)	33.26	32.00	0.940	7.490E-04	0.918	7.283E-04	0.907	1.825E-03
3	9954(1311)	33.26	34.00	0.900	7.263E-04	0.886	7.063E-04	0.894	1.761E-03
4	9974(1311)	33.26	34.00	0.900	7.263E-04	0.886	7.063E-04	0.894	1.761E-03
5	9955(1311)	33.26	36.00	0.900	7.063E-04	0.894	7.063E-04	0.894	1.761E-03
6	9975(1311)	33.26	36.00	0.900	7.063E-04	0.894	7.063E-04	0.894	1.761E-03
7	9956(1311)	33.26	36.00	0.900	7.063E-04	0.894	7.063E-04	0.894	1.761E-03
8	9976(1311)	33.26	36.00	0.900	7.063E-04	0.894	7.063E-04	0.894	1.761E-03
9	9957(1311)	33.26	36.00	0.900	7.063E-04	0.894	7.063E-04	0.894	1.761E-03
10	9977(1311)	33.26	36.00	0.900	7.063E-04	0.894	7.063E-04	0.894	1.761E-03

7425  
GP40  
CNC



$\alpha = 30^\circ$   
 $\phi = 5^\circ$

Figure 13

Group 9D  
7505

$\alpha = 30^\circ$   
 $\beta = 5^\circ$

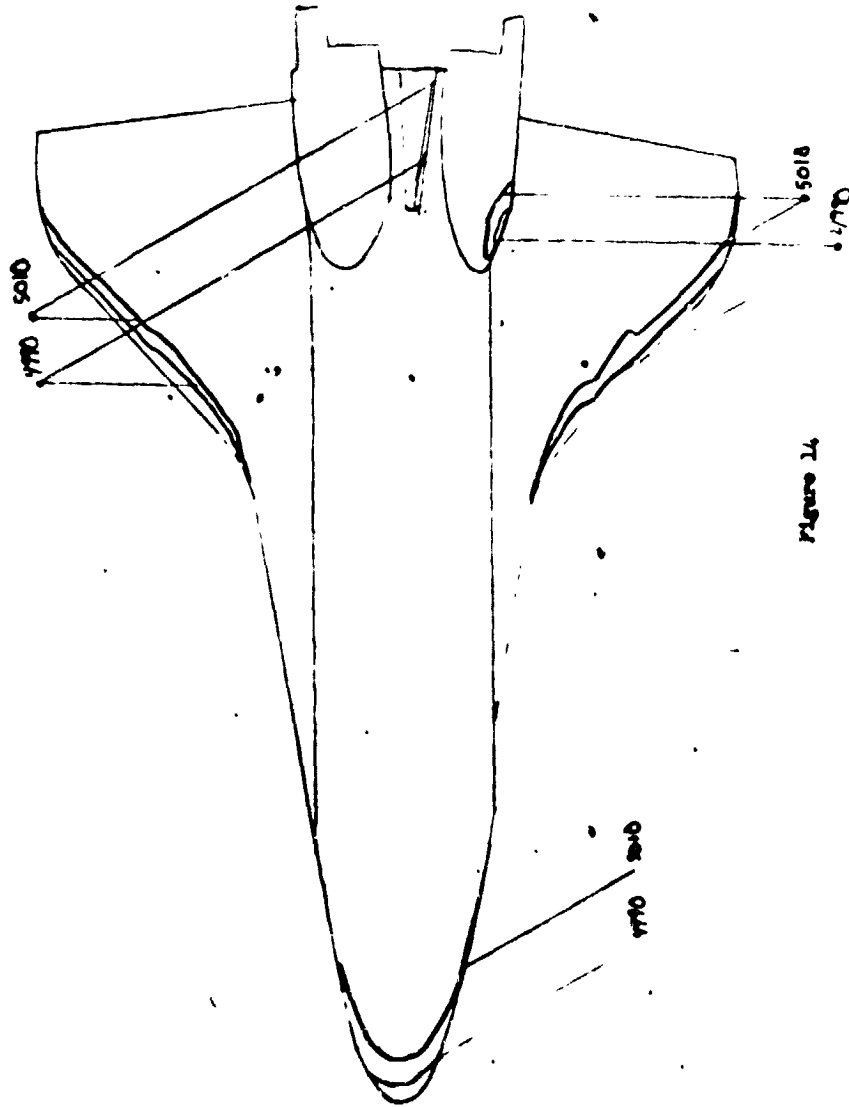


Figure 14

Group 110  
74:0  
105

$\alpha = 30^\circ$   
 $\phi = 5^\circ$

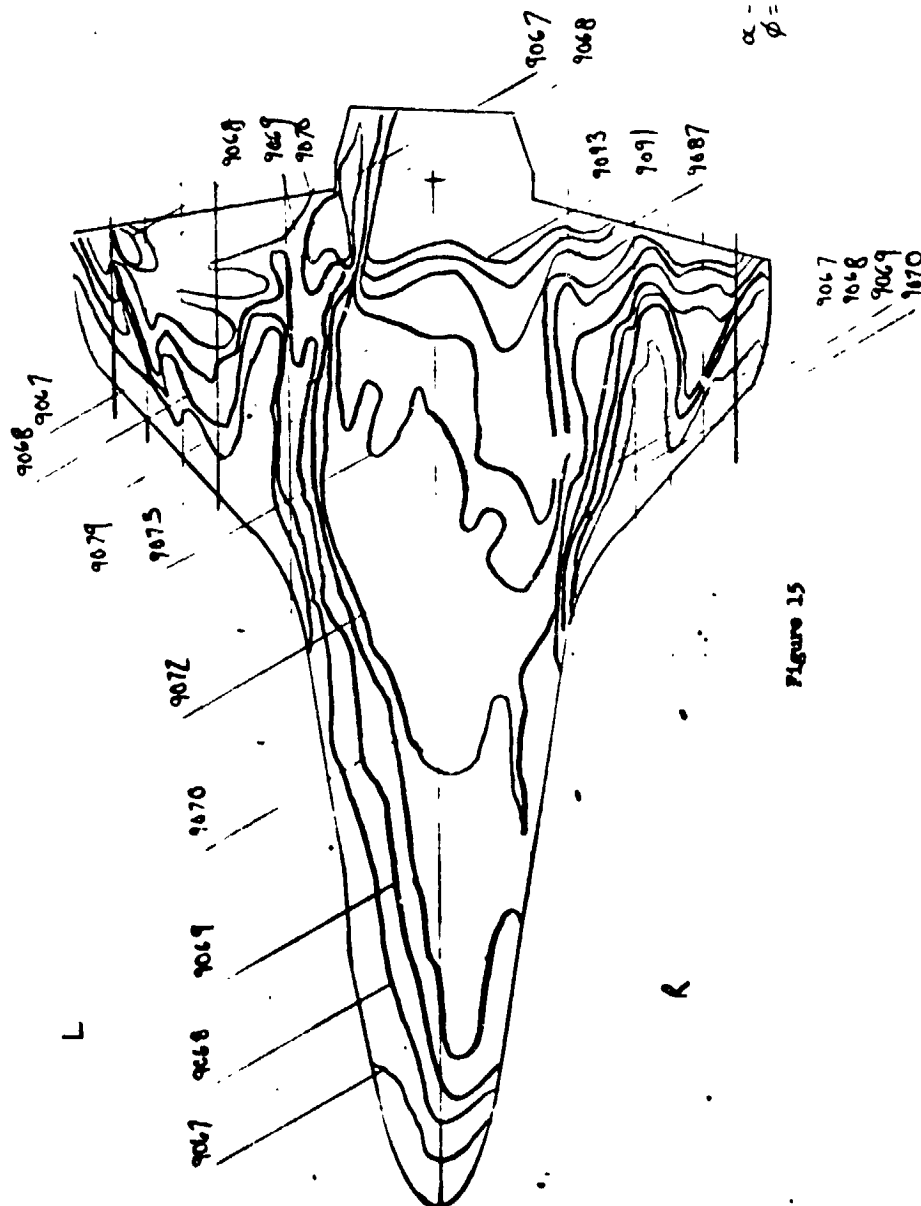


Figure 15

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7/ 9773

NASA-RI ORBITER HEATING

VAP29

AEDC(ARO-INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL R

GROUP CONFIG MODEL MACH NO PO(PSIA) TO(DEG R) ALPHA-MODEL ALPHA-SECTION ALPHA-PREBEND ROLL-MODEL YAW  
 40 2 ORBITER S 7.91 110.3 1252 20.04 -0.41 -30.00 -189.90 4.99

T-INF P-INF U-INF V-INF W-INF MU-INF RF/FT HREF STREF  
 (DEG R) (PSIA) (FT/SEC) (SLUGS/FT<sup>2</sup>) (LB-SEC/FT<sup>2</sup>) (FT-1) (R= .0175EI) (R= .0175EI)  
 92.6 .012 .532 3730 1.101F-05 7.456F-08 5.50RE 05 1.740E-02 5.472E-02

CAMERA ROLL NO PAINT IFMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHOCXK) TRAR(TO) BETA(TO)

TOP(T) 7420  
 SIDE(S) 7425  
 BOTTOM(B) 7505

PIC NO TIME RELTIME H(TO) H(TO)/HREF H(.910) H(.913TO) H(.913TO)/HREF ST(TO)

T 0655(131) 1.15 MODEL HAS NOT REACHED CENTERLINE  
 M 5582(131) 1.15 MODEL HAS NOT REACHED CENTERLINE  
 S 2774(131) 1.18 MODEL HAS NOT REACHED CENTERLINE  
 T 0666(131) 2.23 MODEL HAS NOT REACHED CENTERLINE  
 M 4943(131) 2.23 MODEL HAS NOT REACHED CENTERLINE  
 S 2777(131) 2.25 MODEL HAS NOT REACHED CENTERLINE

INJECT TIME = 2.24

T 0667(131) 3.20 DATA NOT YET VALID

M 4984(131) 3.20 DATA NOT YET VALID

S 2778(131) 3.23 DATA NOT YET VALID

T 0668(131) 4.28 1.910F-03 .1093 2.373E-03 .1331 2.304E-03 .1294 5.867E-03

S 2779(131) 4.28 1.910F-03 .1093 2.373E-03 .1331 2.304E-03 .1294 5.867E-03

M 4945(131) 4.28 1.910F-03 .1093 2.373E-03 .1331 2.304E-03 .1294 5.867E-03

T 0669(131) 5.43 1.664F-03 .0936 2.050E-03 .1150 1.993E-03 .1118 5.066E-03

M 4564(131) 5.43 1.664F-03 .0936 2.050E-03 .1150 1.993E-03 .1118 5.066E-03

S 2780(131) 5.46 1.664F-03 .0936 2.050E-03 .1150 1.993E-03 .1118 5.066E-03

T 0670(131) 6.51 1.407E-03 .0833 1.827E-03 .1024 1.776E-03 .0995 4.506E-03

M 4947(131) 6.51 1.407E-03 .0833 1.827E-03 .1024 1.776E-03 .0995 4.506E-03

S 2781(131) 6.53 1.407E-03 .0833 1.827E-03 .1024 1.776E-03 .0995 4.506E-03

T 0671(131) 7.58 1.354F-03 .0759 1.664E-03 .0933 1.614E-03 .0907 4.107E-03

M 4948(131) 7.58 1.354F-03 .0759 1.664E-03 .0933 1.614E-03 .0907 4.107E-03

S 2782(131) 7.58 1.354F-03 .0759 1.664E-03 .0933 1.614E-03 .0907 4.107E-03

T 0672(131) 8.66 1.251F-03 .0701 1.538E-03 .0822 1.495E-03 .0838 3.793E-03

M 4949(131) 8.66 1.251F-03 .0701 1.538E-03 .0822 1.495E-03 .0838 3.793E-03

S 2783(131) 8.66 1.251F-03 .0701 1.538E-03 .0822 1.495E-03 .0838 3.793E-03

T 0673(131) 9.71 1.111F-03 .0656 1.439E-03 .0806 1.399E-03 .0784 3.549E-03

M 4590(131) 9.71 1.111F-03 .0656 1.439E-03 .0806 1.399E-03 .0784 3.549E-03

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NASA-R1 ORBITER HEATING  
 VA2R9  
 AEDL (ARO, INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL R

GROUP CONFIG MODEL MACH NO PQ (PSIA) TO (DEG R) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREBEND ROLL-MODEL YAW  
 40 2 GREITER S 7.91 110.9 1252 30.04 -.41 -30.00 -189.90 4.99

T-INF P-INF Q-INF V-INF MU-INF RE/FT MREF STREF  
 (DEG R) (PSIA) (PSIA) (FT/SEC) (SLUGS/FT<sup>2</sup>) (LB-SEC/FT<sup>2</sup>) (FT-1) (R= .0175E1) (R= .0175E1)  
 92.4 .012 .515 37.0 1.07E-05 7.458E-05 5.53E 05 1.745E-02 5.458E-02

CAMERA HOLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHOXCAK) TBAR (TO) BETA (TO)  
 TOP (T) 7420 78 7.426E-02 6.9952E-02  
 SIDE (S) 7425  
 BOTTOM (B) 7505

PIC NO	TIME DELT (SEC)	HITOI	HITOI/MREF	M (.910)/MREF	M (.9130)/MREF	M (.9130)/MREF	ST (TO)
S 2784 (131)	9.74	1.109E-03	.0655	1.437E-03	.0805	1.397E-03	3.544E-03
T 9074 (131)	10.19	1.102E-03	.0617	1.355E-03	.0759	1.317E-03	3.339E-03
S 2785 (131)	10.19	1.102E-03	.0617	1.355E-03	.0759	1.317E-03	3.339E-03
M 4997 (131)	10.79	1.102E-03	.0617	1.355E-03	.0759	1.317E-03	3.339E-03
M 4997 (131)	11.86	1.046E-03	.0585	1.284E-03	.0719	1.250E-03	3.165E-03
T 9075 (131)	11.86	1.045E-03	.0585	1.284E-03	.0719	1.248E-03	3.165E-03
S 2786 (131)	11.86	1.045E-03	.0585	1.284E-03	.0719	1.248E-03	3.165E-03
T 9076 (131)	12.91	9.966E-04	.0554	1.225E-03	.0686	1.191E-03	3.018E-03
M 4998 (131)	12.91	9.966E-04	.0554	1.225E-03	.0686	1.191E-03	3.018E-03
S 2787 (131)	12.91	9.966E-04	.0554	1.225E-03	.0686	1.191E-03	3.018E-03
T 9077 (131)	13.59	9.535E-04	.0533	1.172E-03	.0656	1.139E-03	2.883E-03
S 2788 (131)	13.59	9.535E-04	.0533	1.172E-03	.0656	1.139E-03	2.883E-03
M 4999 (131)	13.59	9.535E-04	.0533	1.172E-03	.0656	1.139E-03	2.883E-03
T 9078 (131)	13.74	9.104E-04	.0513	1.126E-03	.0630	1.095E-03	2.773E-03
M 4995 (131)	13.74	9.104E-04	.0513	1.126E-03	.0630	1.095E-03	2.773E-03
S 2789 (131)	15.07	8.155E-04	.0512	1.125E-03	.0630	1.094E-03	2.771E-03
T 9079 (131)	16.12	8.425E-04	.0494	1.055E-03	.0607	1.054E-03	2.668E-03
M 4996 (131)	16.12	8.425E-04	.0494	1.055E-03	.0607	1.054E-03	2.668E-03
S 2790 (131)	16.14	8.411E-04	.0494	1.054E-03	.0607	1.053E-03	2.668E-03
T 9080 (131)	17.19	8.522E-04	.0477	1.047E-03	.0586	1.019E-03	2.579E-03
M 4997 (131)	17.19	8.522E-04	.0477	1.047E-03	.0586	1.019E-03	2.579E-03
T 9081 (131)	18.27	8.247E-04	.0461	1.014E-03	.0567	9.853E-04	2.491E-03
S 2792 (131)	18.27	8.247E-04	.0461	1.014E-03	.0567	9.853E-04	2.491E-03
M 4994 (131)	18.27	8.247E-04	.0461	1.014E-03	.0567	9.853E-04	2.491E-03

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7/ 9/77

AEDC(ARO-IAC) ARJOLU AFS, TENNESSEE  
VOM KAMMAN GAS DYNAMICS FACILITY  
50 INCH HYPERSONIC TUNNEL R

NASA-RI ORRITEM PEATING

VA289

GROUP CONFIC MODEL MACH NO P0(P5IA) T0(DEG R) ALPHA-MODEL ALPHA-SECTION ALPHA-PREBEND ROLL-MODEL YAW  
40 2 0REITER S 7.91 111.2 30.04 -0.41 -30.00 -189.90 4.99

T-INF P-INF U-INF W-INF MU-INF MU-INF DE/FT STRES  
(DEG R) (PSIA) (PSIA) (FI/SEC) (SLUGS/FI2) (LB-SEC/FI2) (FT-1) (IN .0175FI) (IN .0175FI)  
92.7 .012 .537 3731 1.110E-05 7.451E-04 5.553E 05 1.788E-02 5.450E-02

CARFRA MOLL NO PAINT (FAP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHO/CCK) TRAR(TO) BETA(TO)  
TOPIT 7420 78  
SICFIS 7425  
MOTICMIR 7505 .0484 7.428E-02 6.9952E-02

PIC NO	TIME DELTIME	M(TO)	M(TO)/MREF	M(.913TO)	M(.913TO)/MREF	M(.913TO)	ST(TO)
M 4997(131)	19.22	19.04	.0447	9.837E-04	.0550	9.562E-04	2.415E-03
T 5002(131)	19.25	19.07	.0447	9.830E-04	.0550	9.555E-04	2.418E-03
S 2793(131)	19.25	19.07	.0447	9.830E-04	.0550	9.555E-04	2.418E-03
T 5003(131)	20.40	19.12	.0435	9.554E-04	.0534	9.289E-04	2.349E-03
M 5009(131)	20.40	19.12	.0435	9.554E-04	.0534	9.289E-04	2.349E-03
S 2794(131)	20.42	19.14	.0434	9.549E-04	.0534	9.282E-04	2.345E-03
T 5004(131)	21.47	21.27	.0423	9.294E-04	.0520	9.038E-04	2.285E-03
M 5011(131)	21.47	21.27	.0423	9.294E-04	.0520	9.038E-04	2.285E-03
S 2795(131)	21.50	21.27	.0423	9.294E-04	.0520	9.038E-04	2.285E-03
T 5005(131)	22.55	21.27	.0412	9.059E-04	.0519	8.804E-04	2.223E-03
S 2796(131)	22.55	21.27	.0412	9.059E-04	.0519	8.804E-04	2.223E-03
M 5002(131)	22.55	21.27	.0412	9.059E-04	.0519	8.804E-04	2.223E-03
T 5006(131)	23.63	22.36	.0402	8.834E-04	.0504	8.591E-04	2.170E-03
S 2797(131)	23.63	22.36	.0402	8.834E-04	.0504	8.591E-04	2.170E-03
M 5007(131)	23.63	22.36	.0402	8.834E-04	.0504	8.591E-04	2.170E-03
T 5008(131)	24.70	23.42	.0392	8.637E-04	.0494	8.392E-04	2.118E-03
S 2798(131)	24.70	23.42	.0392	8.637E-04	.0494	8.392E-04	2.118E-03
M 5009(131)	24.70	23.42	.0392	8.637E-04	.0494	8.392E-04	2.118E-03
T 5010(131)	25.78	24.48	.0384	8.441E-04	.0482	8.205E-04	2.073E-03
S 2799(131)	25.78	24.48	.0384	8.441E-04	.0482	8.205E-04	2.073E-03
M 5011(131)	25.78	24.48	.0384	8.441E-04	.0482	8.205E-04	2.073E-03
T 5012(131)	26.43	26.15	.0371	8.176E-04	.0472	7.942E-04	2.003E-03
S 2800(131)	26.43	26.15	.0371	8.176E-04	.0472	7.942E-04	2.003E-03
M 5013(131)	26.43	26.15	.0371	8.176E-04	.0472	7.942E-04	2.003E-03
T 5014(131)	26.48	26.21	.0357	7.864E-04	.0456	7.644E-04	1.929E-03
S 2801(131)	26.48	26.21	.0357	7.864E-04	.0456	7.644E-04	1.929E-03
M 5015(131)	26.48	26.21	.0357	7.864E-04	.0456	7.644E-04	1.929E-03

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AFDC (ARJ) INC. AMOLU AR. TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL R

NASA-R1 AORTHEM FEATINE

VA289

WPCJP CMF16 MODEL MACH NO P(PSIA) T(DEG F) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREHEND ROLL-MODEL YAW  
 48 2 QM1EM S 7.91 111.5 1253 30.04 -.41 -30.00 -189.90 4.49

T-INF P-INF Q-INF V-INF WU-INF RUW-INF RF/FT MREF SINEF  
 (DEG R) (PSIA) (PSIA) (FT/SEC) (SLUGS/FT<sup>3</sup>) (LBS-SEC/FT<sup>2</sup>) (FT-L) (R<sup>2</sup> .0175FI) (R<sup>2</sup> .0175FI)  
 92.7 .012 .539 3732 1.113E-05 7.463E-08 5.555E 05 1.791E-02 5.443E-02

CAMEFA MOLL NO PAINT TFWP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHUACR) TRAN(TO) RETA(TO)  
 TOP(T) 7428 131 78 .0494 7.426E-02 6.9952E-02  
 SINF(S) 7425  
 MOTEM(R) 7595

PIC NO	TIME HELTIME	M(TO)	M(TO)/MREF	M(.9TO)	M(.9TO)/MREF	M(.913TO)	M(.913TO)/MREF	ST(TO)
1	909(131) 31.51 30.23	6.143E-04	.0345	7.599E-04	.0425	7.307E-04	.0413	1.865E-03
2	202(131) 31.51 30.23	6.143E-04	.0345	7.599E-04	.0425	7.307E-04	.0413	1.865E-03
3	509(131) 31.51 30.22	6.143E-04	.0345	7.599E-04	.0425	7.307E-04	.0413	1.865E-03
4	809(131) 31.54 32.24	5.946E-04	.0334	7.354E-04	.0411	7.151E-04	.0399	1.803E-03
5	202(131) 31.54 32.24	5.946E-04	.0334	7.354E-04	.0411	7.151E-04	.0399	1.803E-03
6	509(131) 31.56 32.28	5.946E-04	.0334	7.354E-04	.0410	7.148E-04	.0397	1.746E-03
7	809(131) 31.57 34.29	5.846E-04	.0324	7.131E-04	.0394	6.934E-04	.0387	1.749E-03
8	202(131) 31.59 34.31	5.846E-04	.0324	7.131E-04	.0394	6.934E-04	.0387	1.749E-03
9	509(131) 31.62 36.34	5.640E-04	.0315	6.911E-04	.0387	6.738E-04	.0376	1.696E-03
10	202(131) 31.62 36.34	5.640E-04	.0315	6.911E-04	.0387	6.738E-04	.0376	1.696E-03
11	509(131) 31.62 36.34	5.640E-04	.0315	6.911E-04	.0387	6.738E-04	.0376	1.696E-03

MODEL HAS LEFT CENTERLINE

175

307



7425  
GP41  
CWC

$\alpha = 30^\circ$   
 $\phi = 0^\circ$

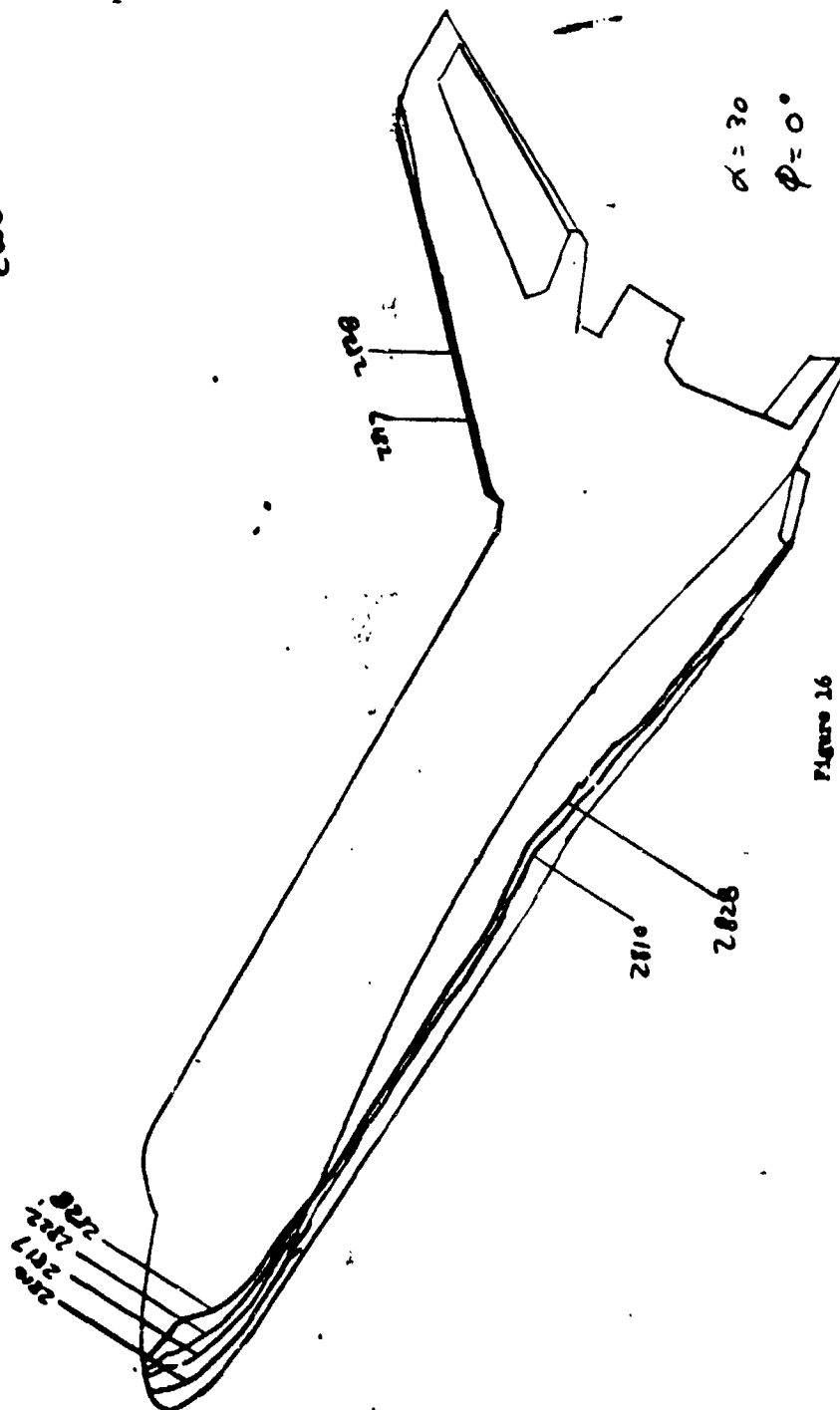


Figure 16

Group 4/  
7505  
Wf

4528  
 $\alpha = 30^\circ$   
 $\phi = 0^\circ$

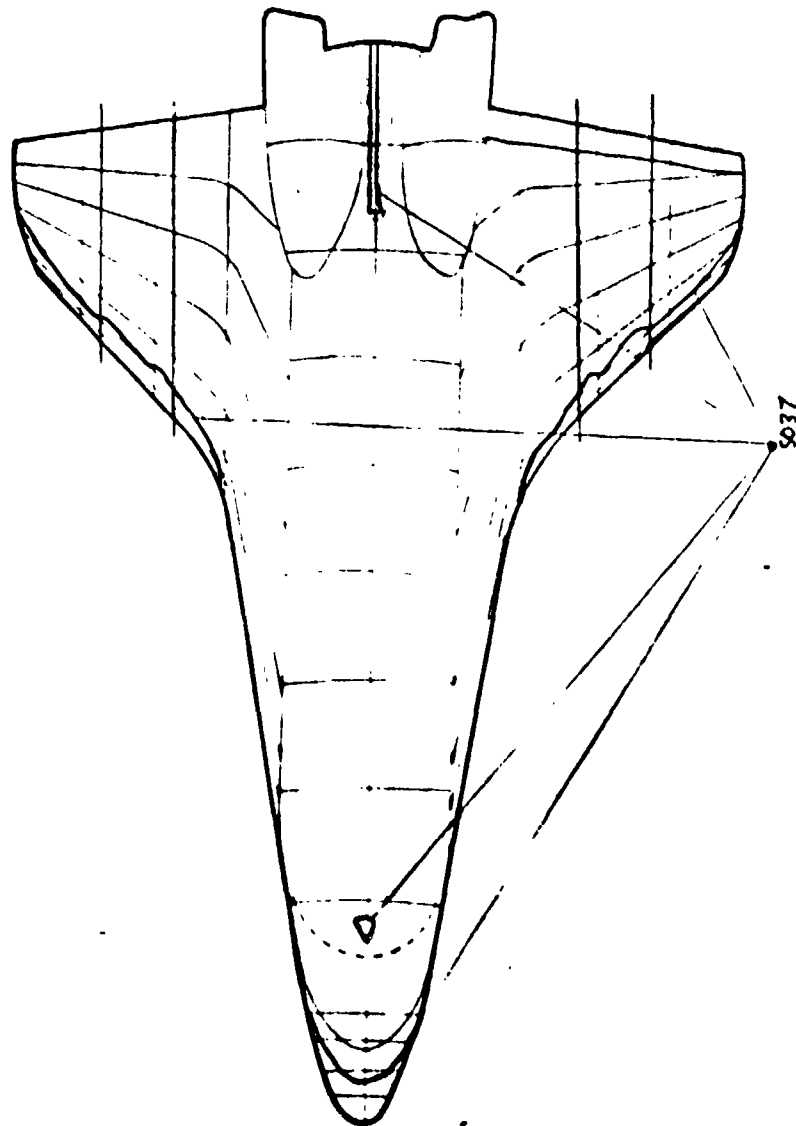


Figure 17

5037

309

D

Group 41  
7120  
✓

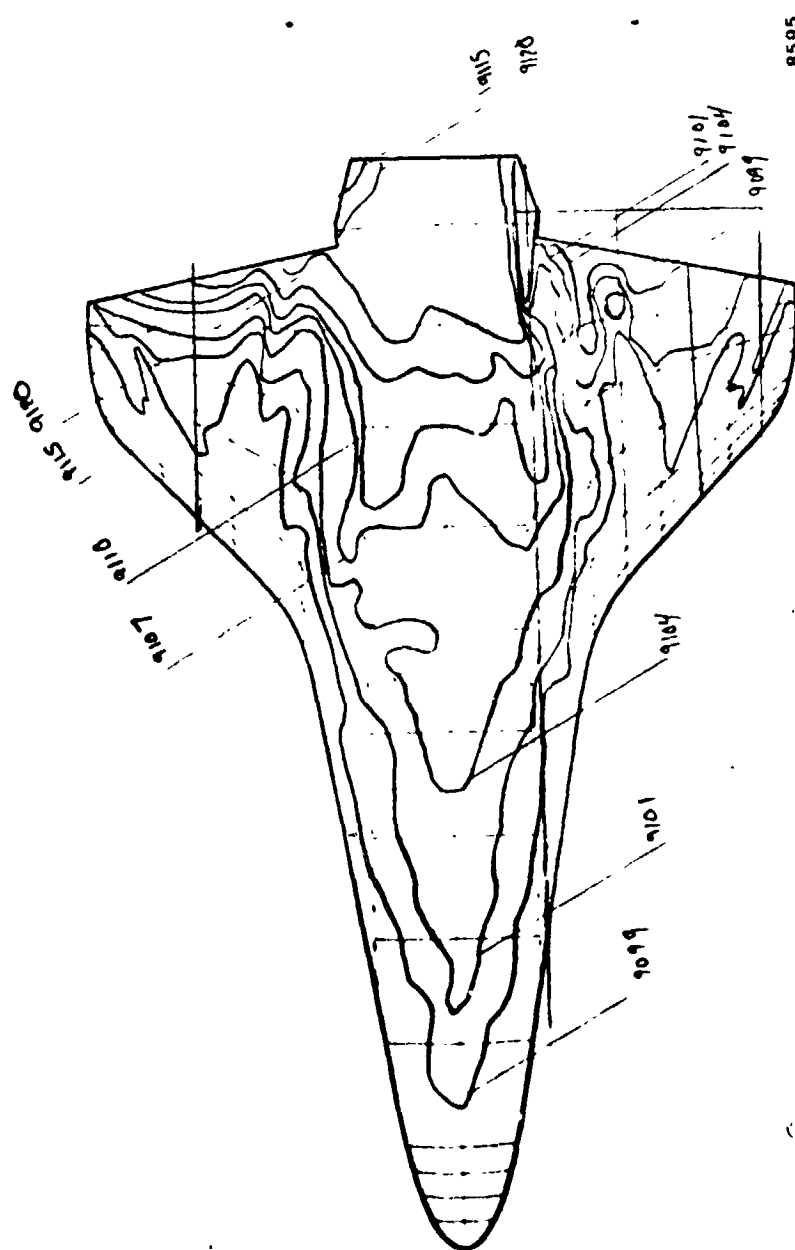


Figure 16

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7/ 9/73

NASA-RJ ORBITER PEATING AEDC(AND INC.) ARNOLD AFS, TENNESSEE  
VON KARMAN GAS DYNAMICS FACILITY  
50 INCH HYPERSONIC TUNNEL B

VA289

GROUP	CONFID	MODEL	MACH NO	PO(PISA)	TO(DEC R)	ALPHA-MODEL	ALPHA-SECTOR	ALPHA-PREBEND	ROLL-MODEL	YAW
41	2	ORBITER S	7.91	108.3	1261	30.02	-0.02	-30.00	-180.00	-0.00
T-INF P-INF Q-INF V-INF MU-INF RE/FT MREF STREF										
(DEG R)	(PSIA)	(PSIA)	(FT/SEC)	(SLUGS/FT <sup>3</sup> )	(FT-1)	(FT-1)	(FT-1)	(FT-1)	(FT-1)	(FT-1)
93.3	.012	.523	3744	1.073E-05	7.511E-08	5.349E 05	1.766E-02	5.547E-02		
CAMERA ROLL NO PAINT IFMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHOC/CAK) TRAR(TO) BETA(TO)										
TOP(T)	7420				78				0	0
STOE(T)	7425									
MOT(M/H)	7505									

PIC NO	TIME DELTIME	M(TO)	H(TO)/MREF	M(.910)	M(.910)/MREF	M(.91210)	M(.91210)/MREF	ST(TO)
T 9095(131)	1.10	MODEL WAS NOT REACHED CENTERLINE						
S 2806(131)	1.10	MODEL WAS NOT REACHED CENTERLINE						
M 5012(131)	1.10	MODEL WAS NOT REACHED CENTERLINE						
T 9096(131)	2.25	MODEL WAS NOT REACHED CENTERLINE						
S 2807(131)	2.25	MODEL WAS NOT REACHED CENTERLINE						
M 5013(131)	2.25	MODEL WAS NOT REACHED CENTERLINE						
INJECT TIME = 2.28								
T 9097(131)	3.20	DATA NOT YET VALID						
M 5014(131)	3.20	DATA NOT YET VALID						
S 2808(131)	3.20	DATA NOT YET VALID						
T 9098(131)	4.28	1.905E-03	.1077	2.338E-03	.1321	2.273E-03	.1285	5.909E-03
M 5015(131)	4.28	1.905E-03	.1077	2.338E-03	.1321	2.273E-03	.1285	5.909E-03
T 9099(131)	4.41	1.849E-03	.1072	2.308E-03	.1315	2.264E-03	.1279	5.800E-03
M 5016(131)	4.41	1.849E-03	.1072	2.308E-03	.1315	2.264E-03	.1279	5.800E-03
T 9100(131)	5.46	1.642E-03	.0927	2.014E-03	.1138	1.959E-03	.1106	5.087E-03
M 5017(131)	5.46	1.642E-03	.0927	2.014E-03	.1138	1.959E-03	.1106	5.087E-03
T 9101(131)	6.48	1.642E-03	.0927	2.014E-03	.1138	1.959E-03	.1106	5.087E-03
M 5018(131)	6.48	1.642E-03	.0927	2.014E-03	.1138	1.959E-03	.1106	5.087E-03
T 9102(131)	6.51	1.467E-03	.0829	1.801E-03	.1017	1.751E-03	.0989	4.543E-03
M 5019(131)	6.51	1.467E-03	.0829	1.801E-03	.1017	1.751E-03	.0989	4.543E-03
T 9103(131)	6.53	1.464E-03	.0827	1.794E-03	.1014	1.746E-03	.0986	4.532E-03
M 5020(131)	6.53	1.464E-03	.0827	1.794E-03	.1014	1.746E-03	.0986	4.532E-03
T 9104(131)	7.50	1.336E-03	.0755	1.640E-03	.0926	1.594E-03	.0900	4.137E-03
M 5021(131)	7.50	1.336E-03	.0755	1.640E-03	.0926	1.594E-03	.0900	4.137E-03
T 9105(131)	7.58	1.336E-03	.0755	1.640E-03	.0926	1.594E-03	.0900	4.137E-03
M 5022(131)	7.58	1.336E-03	.0755	1.640E-03	.0926	1.594E-03	.0900	4.137E-03
T 9106(131)	8.63	1.237E-03	.0694	1.514E-03	.0856	1.471E-03	.0832	3.827E-03
M 5023(131)	8.63	1.237E-03	.0694	1.514E-03	.0856	1.471E-03	.0832	3.827E-03
T 9107(131)	8.66	1.235E-03	.0694	1.515E-03	.0856	1.473E-03	.0832	3.827E-03
M 5024(131)	8.66	1.235E-03	.0694	1.515E-03	.0856	1.473E-03	.0832	3.827E-03
T 9108(131)	9.71	1.155E-03	.0652	1.418E-03	.0801	1.379E-03	.0778	3.577E-03
M 5025(131)	9.71	1.155E-03	.0652	1.418E-03	.0801	1.379E-03	.0778	3.577E-03

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AEDC(ARPO-INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL R

NASA-WI ORBITER HEATING

VA289

GROUP	CONFID	MODEL	MACH NO	POI(PST)	TO(DEL R)	ALPHA-MODEL	ALPHA-SECTION	ALPHA-PREBEND	ROLL-MODEL	YAW
41	2	ORBITER S	7.91	108.9	1261	20.02	-0.02	-30.00	-180.00	-0.00
T-1AF	P-1NF	Q-1NF	V-1NF	RNO-1NF	MC-1NF	RF/FT	MREF	STREF		
(DEG R)	(PSIA)	(FT/SEC)	(LUGS/FT)	(LUGS/FT)	(LUGS/FT)	(FT-L)	(IN)	(IN)		
93.3	-0.12	526	3746	1.079E-05	7.513E-08	5.379E 05	.771E-02	5.532E-02		
CAMERA	COLL NO	PAINT IFOP (DEG F)	INITIAL PMP (DEG F)	SQUARE	DT (RHOXCAR)	TRAR(TOI)	BETA(TOI)			
TOP(IT)	7420									
SIDE(S)	7425	131	78	.0466		7.335E-02	6.9036E-02			
WITCHUBI	7585									

PIC NO	TIME RELTIME	M(TOI)	M(TOI)/MREF	M(L-910)	M(L-910)/MREF	M(L-912TO)	M(L-912TO)/MREF	ST(TOI)
S 2P14(131)	9.74	1.154E-03	.0651	1.416E-03	.0799	1.317E-03	.0777	3.569E-03
T 9104(131)	10.79	1.008E-03	.0614	1.335E-03	.0754	1.298E-03	.0733	3.366E-03
S 2P15(131)	10.79	1.008E-03	.0614	1.335E-03	.0754	1.298E-03	.0733	3.366E-03
M 5021(131)	10.79	1.008E-03	.0614	1.335E-03	.0754	1.298E-03	.0733	3.366E-03
M 5022(131)	11.64	1.032E-03	.0582	1.267E-03	.0715	1.232E-03	.0695	3.191E-03
T 4105(131)	11.66	1.031E-03	.0582	1.265E-03	.0714	1.230E-03	.0694	3.190E-03
S 2P16(131)	11.66	1.031E-03	.0582	1.265E-03	.0714	1.230E-03	.0694	3.190E-03
T 9104(131)	12.51	9.834E-04	.0555	1.207E-03	.0681	1.174E-03	.0662	3.043E-03
M 5023(131)	12.51	9.834E-04	.0555	1.207E-03	.0681	1.174E-03	.0662	3.043E-03
S 2P17(131)	12.54	9.825E-04	.0554	1.204E-03	.0680	1.172E-03	.0661	3.036E-03
T 9107(131)	13.59	9.410E-04	.0531	1.155E-03	.0651	1.123E-03	.0633	2.908E-03
M 5024(131)	13.59	9.410E-04	.0531	1.155E-03	.0651	1.123E-03	.0633	2.908E-03
S 2P18(131)	15.07	9.601E-04	.0530	1.154E-03	.0651	1.122E-03	.0633	2.906E-03
T 9108(131)	15.07	9.601E-04	.0530	1.154E-03	.0651	1.122E-03	.0633	2.906E-03
S 2P19(131)	15.07	9.601E-04	.0530	1.154E-03	.0651	1.122E-03	.0633	2.906E-03
M 5025(131)	15.07	9.601E-04	.0530	1.154E-03	.0651	1.122E-03	.0633	2.906E-03
S 2P20(131)	16.12	9.710E-04	.0491	1.068E-03	.0625	1.074E-03	.0608	2.790E-03
T 9109(131)	16.14	9.702E-04	.0491	1.068E-03	.0625	1.074E-03	.0608	2.790E-03
M 5026(131)	16.14	9.702E-04	.0491	1.068E-03	.0625	1.074E-03	.0608	2.790E-03
T 9110(131)	17.19	9.410E-04	.0530	1.154E-03	.0651	1.122E-03	.0633	2.906E-03
M 5027(131)	17.19	9.410E-04	.0530	1.154E-03	.0651	1.122E-03	.0633	2.906E-03
S 2P21(131)	17.22	9.410E-04	.0530	1.154E-03	.0651	1.122E-03	.0633	2.906E-03
T 9111(131)	18.27	9.139E-04	.0459	9.998E-04	.0543	9.711E-04	.0547	2.511E-03
S 2P22(131)	18.27	9.139E-04	.0459	9.998E-04	.0543	9.711E-04	.0547	2.511E-03
T 9112(131)	18.27	9.139E-04	.0459	9.998E-04	.0543	9.711E-04	.0547	2.511E-03
M 5028(131)	18.27	9.139E-04	.0459	9.998E-04	.0543	9.711E-04	.0547	2.511E-03
T 9113(131)	18.20	9.139E-04	.0459	9.998E-04	.0543	9.711E-04	.0547	2.511E-03

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7/ 9/73

NASA-RI ORBITER HEATING AEDC(ARO-INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL

VA204

GROUP C-CONFIG MODEL MACH NO PO(PSIA) T0(DEG F) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREBEND ROLL-MODEL YAW  
 41 19-25 10-07 7.91 109.2 1261 30.02 -.02 -30.00 -100.00 -.00  
 T-1NF P-1NF 0-1NF Y-1NF MU-1NF RE/FT MREF STREF  
 (DEG F) (PSIA) (FT/SEC) (SLUGS/FT<sup>3</sup>) (LBS-SEC/FT<sup>2</sup>) (FT-1) (LBS-0175FT) (LBS-0175FT)  
 93.3 .012 .527 3744 1.002E-05 7.512E-04 5.192E 04 1.773E-02 5.525E-02  
 CAMERA ROLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHOXCHK) TRAR(10) BETA(10)  
 TOP(1) 7420 131 70 .0484 7.335E-02 6.9036E-02  
 510F(1) 7425  
 BOTTOM(1) 7505

PTC NO	TIME DELTIME	M(10)	M(10)/MREF	M(10)	M(10)/MREF	M(10)	M(10)/MREF	M(10)	M(10)/MREF	ST(10)
T 9112(131)	19-25	7.893E-04	.0445	9.486E-04	.0446	9.418E-04	.0531	9.418E-04	.0531	2.437E-03
S 2023(131)	19-25	7.893E-04	.0445	9.486E-04	.0446	9.418E-04	.0531	9.418E-04	.0531	2.437E-03
M 4220(131)	19-25	7.893E-04	.0445	9.486E-04	.0446	9.418E-04	.0531	9.418E-04	.0531	2.437E-03
T 9113(131)	20-42	7.868E-04	.0432	9.410E-04	.0430	9.149E-04	.0516	9.149E-04	.0516	2.366E-03
S 2024(131)	20-42	7.868E-04	.0432	9.410E-04	.0430	9.149E-04	.0516	9.149E-04	.0516	2.366E-03
M 4030(131)	20-42	7.868E-04	.0432	9.410E-04	.0430	9.149E-04	.0516	9.149E-04	.0516	2.366E-03
T 9114(131)	21-07	7.868E-04	.0432	9.410E-04	.0430	9.149E-04	.0516	9.149E-04	.0516	2.366E-03
M 4031(131)	21-07	7.868E-04	.0432	9.410E-04	.0430	9.149E-04	.0516	9.149E-04	.0516	2.366E-03
S 2025(131)	21-07	7.868E-04	.0432	9.410E-04	.0430	9.149E-04	.0516	9.149E-04	.0516	2.366E-03
T 9115(131)	22-55	7.275E-04	.0410	8.927E-04	.0403	8.679E-04	.0489	8.679E-04	.0489	2.242E-03
S 2026(131)	22-55	7.275E-04	.0410	8.927E-04	.0403	8.679E-04	.0489	8.679E-04	.0489	2.242E-03
M 4032(131)	22-55	7.275E-04	.0410	8.927E-04	.0403	8.679E-04	.0489	8.679E-04	.0489	2.242E-03
T 9116(131)	23-03	7.275E-04	.0410	8.927E-04	.0403	8.679E-04	.0489	8.679E-04	.0489	2.242E-03
M 4033(131)	23-03	7.275E-04	.0410	8.927E-04	.0403	8.679E-04	.0489	8.679E-04	.0489	2.242E-03
S 2027(131)	23-03	7.275E-04	.0410	8.927E-04	.0403	8.679E-04	.0489	8.679E-04	.0489	2.242E-03
T 9117(131)	25-05	6.754E-04	.0390	8.298E-04	.0387	8.054E-04	.0454	8.054E-04	.0454	2.080E-03
S 2028(131)	25-05	6.754E-04	.0390	8.298E-04	.0387	8.054E-04	.0454	8.054E-04	.0454	2.080E-03
M 4034(131)	25-05	6.754E-04	.0390	8.298E-04	.0387	8.054E-04	.0454	8.054E-04	.0454	2.080E-03
T 9118(131)	27-08	6.433E-04	.0365	7.967E-04	.0365	7.747E-04	.0436	7.747E-04	.0436	1.998E-03
M 4035(131)	27-08	6.433E-04	.0365	7.967E-04	.0365	7.747E-04	.0436	7.747E-04	.0436	1.998E-03
S 2029(131)	28-01	6.433E-04	.0365	7.967E-04	.0365	7.747E-04	.0436	7.747E-04	.0436	1.998E-03
T 9119(131)	30-03	6.257E-04	.0352	7.674E-04	.0352	7.465E-04	.0420	7.465E-04	.0420	1.927E-03
S 2030(131)	30-03	6.257E-04	.0352	7.674E-04	.0352	7.465E-04	.0420	7.465E-04	.0420	1.927E-03
M 4036(131)	30-03	6.257E-04	.0352	7.674E-04	.0352	7.465E-04	.0420	7.465E-04	.0420	1.927E-03
T 9120(131)	32-06	6.047E-04	.0341	7.421E-04	.0341	7.215E-04	.0406	7.215E-04	.0406	1.862E-03
S 2031(131)	32-06	6.047E-04	.0341	7.421E-04	.0341	7.215E-04	.0406	7.215E-04	.0406	1.862E-03
M 4037(131)	32-06	6.047E-04	.0341	7.421E-04	.0341	7.215E-04	.0406	7.215E-04	.0406	1.862E-03

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60204

AEOLIAO, INC.) ARMOLO AFS, TENNESSEE  
VON KARMAN GAS DYNAMICS FACILITY  
50 INCH HYPERSONIC TUNNEL A

71 9173

GROUP	CRAFT	MODEL	MACH NO	DR(PISA)	Y(06 R)	ALPHA-MODEL	ALPHA-SECTOR	ALPHA-PREBEND	ROLL-MODEL	YAW
41	2	GREIFER 5	7.91	109.5	1261	30.02	-02	-30.00	-180.0	-0.00

1-TAF	0-TAF	Q-TAF	U-TAF	RMQ-INF	MU-INF	DF/FT	WDEF	STREF
DEG 0)	(OSIA)	(PSIA)	(F/SEF)	(SLUGS/FI)	(R-SEC/FI)	(F-I)	(R-	(LSEI)
93.3	.012	.528	.3764	1.045E-05	7.513F-04	5.406E 05	1.776E-02	5.517F-02

CAMERA	WOLL NO	PAINT (PMP	(DEG F)	INITIAL TEMP (DFG F)	SQUARE ROOT (RHO/CHK)	TRAR(TO)	BETA(TO)
TOP(T)	7420						
SIC(FI)	7425	131		78	0.0000	7.335E-02	6.9036E-02
MOTOM(R)	7426						

PIC NO	TIME DELT/SEC	M(TOI)	M(TOI)/MREF	M(-970)	M(-912TO)	M(-970)/MREF	M(-912TO)/MREF	ST(TO)
1	9121131	34.09	0.330	5.57E-04	7.18E-04	0.405	6.98E-04	1.604E-03
2	9121131	34.09	0.331	5.57E-04	7.18E-04	0.405	6.98E-04	1.604E-03
3	2232131	36.11	0.328	5.55E-04	7.18E-04	0.404	6.98E-04	1.602E-03
4	9123131	36.12	0.328	5.56E-04	6.97E-04	0.393	6.78E-04	1.749E-03
5	9123131	36.14	0.328	5.56E-04	6.97E-04	0.392	6.78E-04	1.748E-03
6	2033 131	36.14	0.328	5.56E-04	6.97E-04	0.392	6.78E-04	1.748E-03

Group 42  
147C  
m

8585  
 $\alpha = 30^\circ$   
 $\phi = 0^\circ$

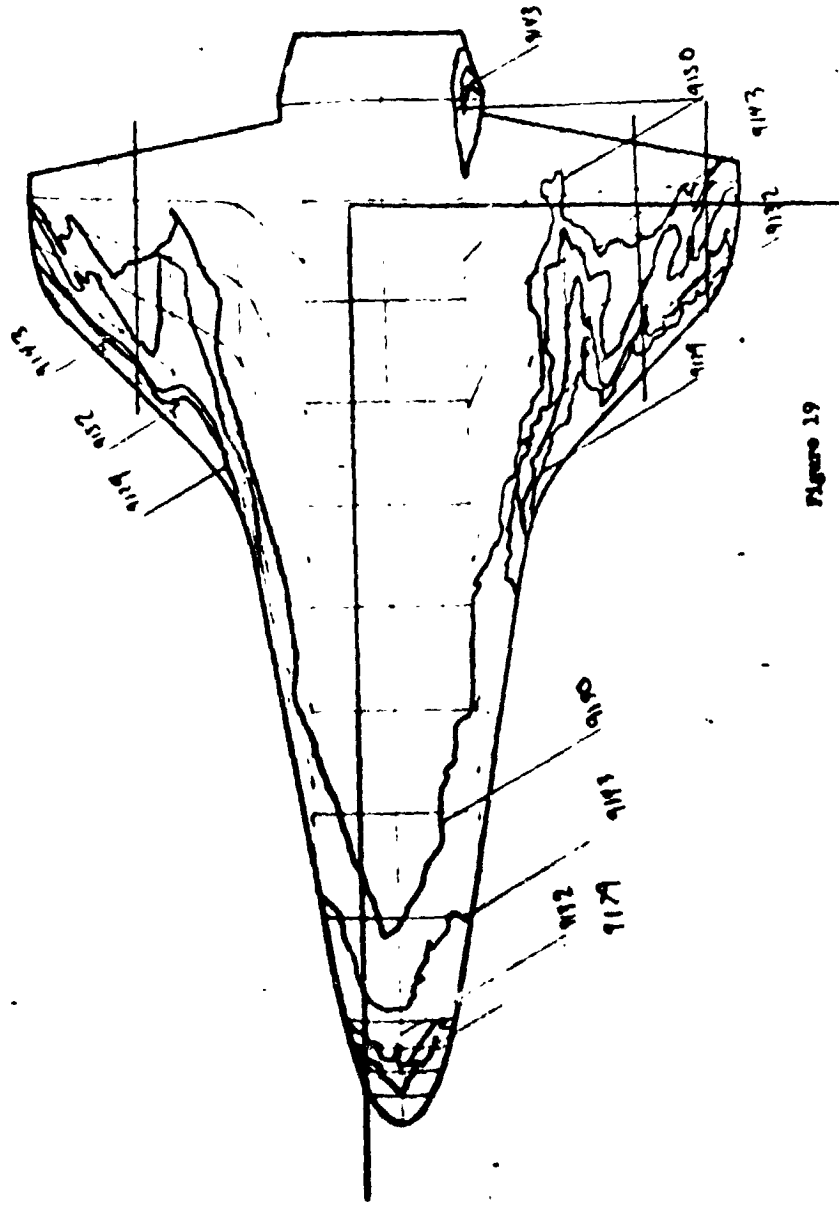


Figure 19

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NASA-01 ORBITER PEATING  
 AEDC(ARL-INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL R

GROUP COMPID MODEL MACH NO P(PSIA) T(IDEG R) ALPHA-MODEL ALPHA-SECTION ALPHA-PREBEND ROLL-MODEL YAW  
 47 2 CRE:TFM S 7.91 110.1 1259 30.01 -.01 -30.00 -180.00 -.00  
 T-TAF P-TAF Q-TAF V-TAF RHO-INF MU-INF DE/FT MREF STREF  
 IDEG R) (PSIA) (F1/SEC) (SLUGS/F13) (LB-SEC/F12) (F1-1) (RHO-017SE11) (RHO-017SE11)  
 93.2 .012 .511 37.1 1.092E-05 7.501E-08 5.449E-05 1.740E-02 5.497E-02  
 CAMERA ROLL NO PAINT IFMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHO/CRAK) TBAR(TO) BETA(TO)  
 TOP(T) 7420 200 70 .0519 0 0  
 SIDE(S) 7425  
 MOTIC(M) 7425

PIC NO TIME DELTIME HITOI HITOI/MREF MI.910) MI.912TO) MI.912TO) MREF ST(TO)  
 M 5001(200) 1.15 MODEL HAS NOT REACHED CENTERLINE MI.910) MI.912TO) MI.912TO) MREF ST(TO)  
 T 9123(200) 1.16 MODEL HAS NOT REACHED CENTERLINE  
 S 2036(200) 1.18 MODEL HAS NOT REACHED CENTERLINE  
 T 9124(200) 2.23 MODEL HAS NOT REACHED CENTERLINE  
 M 5001(200) 2.23 MODEL HAS NOT REACHED CENTERLINE  
 S 2035(200) 2.25 MODEL HAS NOT REACHED CENTERLINE  
 INJECT TIME = 2.24  
 T 9125(200) 3.10 DATA NOT YET VALID  
 M 5002(200) 3.10 DATA NOT YET VALID  
 S 2036(200) 3.23 DATA NOT YET VALID  
 T 9126(200) 4.20 3.10 5.115E-03 6.419E-03 3.601 6.222E-03 3.490 1.555E-02  
 M 5003(200) 4.20 3.10 5.115E-03 6.419E-03 3.601 6.222E-03 3.490 1.555E-02  
 S 2037(200) 4.21 3.10 5.115E-03 6.419E-03 3.601 6.222E-03 3.490 1.555E-02  
 T 9127(200) 5.06 4.10 5.531E-03 5.531E-03 3.103 5.361E-03 3.007 1.340E-02  
 M 5004(200) 5.06 4.10 5.531E-03 5.531E-03 3.103 5.361E-03 3.007 1.340E-02  
 S 2038(200) 5.06 4.10 5.531E-03 5.531E-03 3.103 5.361E-03 3.007 1.340E-02  
 T 9128(200) 6.23 5.20 4.932E-03 4.932E-03 2.765 4.740E-03 2.680 1.194E-02  
 M 5005(200) 6.23 5.20 4.932E-03 4.932E-03 2.765 4.740E-03 2.680 1.194E-02  
 S 2039(200) 7.50 6.31 4.502E-03 4.502E-03 2.521 4.355E-03 2.443 1.089E-02  
 T 9129(200) 7.61 6.31 4.502E-03 4.502E-03 2.521 4.355E-03 2.443 1.089E-02  
 M 5006(200) 7.61 6.31 4.502E-03 4.502E-03 2.521 4.355E-03 2.443 1.089E-02  
 S 2040(200) 8.66 7.70 4.141E-03 4.141E-03 2.333 4.033E-03 2.261 1.007E-02  
 T 9130(200) 8.66 7.70 4.141E-03 4.141E-03 2.333 4.033E-03 2.261 1.007E-02  
 M 5007(200) 8.66 7.70 4.141E-03 4.141E-03 2.333 4.033E-03 2.261 1.007E-02  
 S 2041(200) 9.74 8.44 3.887E-03 3.887E-03 2.140 3.768E-03 2.113 9.410E-03  
 T 9131(200) 9.74 8.44 3.887E-03 3.887E-03 2.140 3.768E-03 2.113 9.410E-03  
 M 5008(200) 9.74 8.44 3.887E-03 3.887E-03 2.140 3.768E-03 2.113 9.410E-03

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AFDC(AND INC.) AMNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL H

MASA-RI ORBITER HEATING

WAZ09

GROUP C/MFTE MCHL S MACH NO PR(PSTIA) TO(UEG U) ALPHA-MODEL ALPHA-SECTION ALPHA-PREHEND ROLL-MODEL YAW  
 42 2 2 7.91 110.5 1259 30.01 -.01 -30.00 -180.00 -.00

T-INF P-INF Q-INF V-INF MU-INF MU-INF HF/FT HREF STREF  
 (DEG R) (PSIA) (PSIA) (ET/SEC) (SLUGS/FT<sup>3</sup>) (LB-SEC/FT<sup>2</sup>) (FT-L) (R= .0175E11 (R=.0175E11  
 93.1 .012 .533 3741 1.097E-05 7.499E-08 5.470E 05 1.783E-02 5.486E-02

CAMFRA ROLL NO PAINT (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHOXCAK) TRANSITO BETA(10)  
 TOP(T) 7420 78  
 SIDE(S) 7425  
 BOTTOM(B) 7505 1.693E-01 1.7358E-01

PIC NO	TIME RELTIME	M(10)	M(10)/MREF	M(.910)	M(.910)/MREF	M(.91210)	M(.91210)/MREF	ST(10)	
S 2842(200)	9.76	8.4P	3.843E-03	.1734	3.843E-03	.2176	3.762E-03	.2109	9.397E-03
T 9132(200)	10.81	9.53	2.918E-03	.1635	3.661E-03	.2052	3.549E-03	.1989	8.856E-03
S 2843(200)	10.81	9.53	2.918E-03	.1635	3.661E-03	.2052	3.549E-03	.1989	8.856E-03
T 9133(200)	10.81	9.53	2.918E-03	.1635	3.661E-03	.2052	3.549E-03	.1989	8.856E-03
S 2844(200)	11.56	10.50	2.769E-03	.1551	3.470E-03	.1946	3.364E-03	.1887	8.397E-03
T 9134(200)	11.56	10.50	2.769E-03	.1551	3.470E-03	.1946	3.364E-03	.1887	8.397E-03
S 2845(200)	11.56	10.50	2.769E-03	.1551	3.470E-03	.1946	3.364E-03	.1887	8.397E-03
T 9135(200)	11.56	10.50	2.769E-03	.1551	3.470E-03	.1946	3.364E-03	.1887	8.397E-03
S 2846(200)	12.54	11.66	2.630E-03	.1479	3.310E-03	.1855	3.209E-03	.1798	8.007E-03
T 9136(200)	12.54	11.66	2.630E-03	.1479	3.310E-03	.1855	3.209E-03	.1798	8.007E-03
S 2847(200)	12.54	11.66	2.630E-03	.1479	3.310E-03	.1855	3.209E-03	.1798	8.007E-03
T 9138(200)	12.54	11.66	2.630E-03	.1479	3.310E-03	.1855	3.209E-03	.1798	8.007E-03
S 2848(200)	13.81	13.81	2.424E-03	.1359	3.042E-03	.1705	2.948E-03	.1652	7.357E-03
T 9139(200)	13.81	13.81	2.424E-03	.1359	3.042E-03	.1705	2.948E-03	.1652	7.357E-03
S 2849(200)	13.81	13.81	2.424E-03	.1359	3.042E-03	.1705	2.948E-03	.1652	7.357E-03
T 9140(200)	13.81	13.81	2.424E-03	.1359	3.042E-03	.1705	2.948E-03	.1652	7.357E-03
S 2850(200)	14.02	12.74	2.524E-03	.1415	3.167E-03	.1775	3.070E-03	.1721	7.661E-03
T 9141(200)	14.02	12.74	2.524E-03	.1415	3.167E-03	.1775	3.070E-03	.1721	7.661E-03
S 2851(200)	14.02	12.74	2.524E-03	.1415	3.167E-03	.1775	3.070E-03	.1721	7.661E-03
T 9142(200)	14.02	12.74	2.524E-03	.1415	3.167E-03	.1775	3.070E-03	.1721	7.661E-03
S 2852(200)	15.09	13.81	2.424E-03	.1359	3.042E-03	.1705	2.948E-03	.1652	7.357E-03
T 9143(200)	15.09	13.81	2.424E-03	.1359	3.042E-03	.1705	2.948E-03	.1652	7.357E-03
S 2853(200)	15.09	13.81	2.424E-03	.1359	3.042E-03	.1705	2.948E-03	.1652	7.357E-03
T 9144(200)	15.09	13.81	2.424E-03	.1359	3.042E-03	.1705	2.948E-03	.1652	7.357E-03
S 2854(200)	16.17	14.89	2.335E-03	.1309	2.930E-03	.1642	2.839E-03	.1591	7.086E-03
T 9145(200)	16.17	14.89	2.335E-03	.1309	2.930E-03	.1642	2.839E-03	.1591	7.086E-03
S 2855(200)	16.17	14.89	2.335E-03	.1309	2.930E-03	.1642	2.839E-03	.1591	7.086E-03
T 9146(200)	16.17	14.89	2.335E-03	.1309	2.930E-03	.1642	2.839E-03	.1591	7.086E-03
S 2856(200)	17.24	15.97	2.255E-03	.1263	2.829E-03	.1585	2.742E-03	.1536	6.837E-03
T 9147(200)	17.24	15.97	2.255E-03	.1263	2.829E-03	.1585	2.742E-03	.1536	6.837E-03
S 2857(200)	17.24	15.97	2.255E-03	.1263	2.829E-03	.1585	2.742E-03	.1536	6.837E-03
T 9148(200)	17.24	15.97	2.255E-03	.1263	2.829E-03	.1585	2.742E-03	.1536	6.837E-03
S 2858(200)	18.32	17.04	2.182E-03	.1223	2.738E-03	.1535	2.654E-03	.1488	6.623E-03
T 9149(200)	18.32	17.04	2.182E-03	.1223	2.738E-03	.1535	2.654E-03	.1488	6.623E-03
S 2859(200)	18.32	17.04	2.182E-03	.1223	2.738E-03	.1535	2.654E-03	.1488	6.623E-03
T 9150(200)	18.32	17.04	2.182E-03	.1223	2.738E-03	.1535	2.654E-03	.1488	6.623E-03

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NASA-RI ORBITER HEATING AECI(ARO-INC.) ARNOLD AFS, TENNESSEE  
VON KARMAN GAS DYNAMICS FACILITY  
50 INCH HYPERSONIC TUNNEL R  
VA249

GROUP	CONFID	MODEL	MACH NO	POI(PSIA)	TO(EG R)	ALPHA-MODEL	ALPHA-SECTOR	ALPHA-PREBEND	ROLL-MODEL	YAW
47	2	ORBITER S	7.91	110.6	1259	30.01	-0.1	-30.00	-180.00	-0.00
T-INF P-INF O-INF V-INF MU-INF MU-INF RE/F1 MREF STREF										
(DGC R)	(PSIA)	(PSIA)	(FT/SEC)	(SLUGS/FT3)	(R-SEC/FT2)	(F1-1)	(R-0.175F1)	(R-0.175F1)		
93.1	0.12	0.53	3741	1.008E-05	7.594E-08	5.476E 05	1.744E-02	5.444E-02		
CANSEA ROLL NO PAINT (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (INCH/SEC) TRAR(TO) BETA(TO)										
TOPIT)	7420									
SIDE(S)	7425	200	7P						1.693E-01	1.7358E-01
MOTOM(R)	7505									

PIC NO	TIME DELTIME	Y(TO)	H(TO)/MREF	H(.9TO)/MREF	H(.912TO)	H(.912TO)/MREF	ST(TO)
T 9140(200)	19.40	2.116E-03	.1186	2.656E-03	2.574E-03	.1442	6.418E-03
S 2051(200)	19.40	2.116E-03	.1186	2.656E-03	2.574E-03	.1442	6.418E-03
M 5051(200)	19.40	2.116E-03	.1186	2.656E-03	2.574E-03	.1442	6.418E-03
T 9141(200)	20.45	2.054E-03	.1152	2.582E-03	2.501E-03	.1401	6.234E-03
S 2052(200)	20.47	2.054E-03	.1152	2.582E-03	2.501E-03	.1401	6.234E-03
M 5052(200)	20.47	2.054E-03	.1152	2.582E-03	2.501E-03	.1401	6.234E-03
T 9142(200)	21.52	2.002E-03	.1121	2.512E-03	2.434E-03	.1363	6.071E-03
S 2053(200)	21.55	2.002E-03	.1121	2.512E-03	2.434E-03	.1363	6.071E-03
M 5053(200)	21.55	2.002E-03	.1121	2.512E-03	2.434E-03	.1363	6.071E-03
T 9143(200)	22.63	1.950E-03	.1092	2.442E-03	2.371E-03	.1328	5.916E-03
S 2054(200)	22.63	1.950E-03	.1092	2.442E-03	2.371E-03	.1328	5.916E-03
M 5054(200)	22.63	1.950E-03	.1092	2.442E-03	2.371E-03	.1328	5.916E-03
T 9144(200)	23.70	1.902E-03	.1066	2.382E-03	2.314E-03	.1296	5.769E-03
S 2055(200)	23.70	1.902E-03	.1066	2.382E-03	2.314E-03	.1296	5.769E-03
M 5055(200)	23.70	1.902E-03	.1066	2.382E-03	2.314E-03	.1296	5.769E-03
T 9145(200)	24.83	1.827E-03	.1023	2.292E-03	2.222E-03	.1244	5.533E-03
S 2056(200)	24.83	1.827E-03	.1023	2.292E-03	2.222E-03	.1244	5.533E-03
M 5056(200)	24.83	1.827E-03	.1023	2.292E-03	2.222E-03	.1244	5.533E-03
T 9146(200)	26.38	1.754E-03	.0942	2.201E-03	2.133E-03	.1195	5.314E-03
S 2057(200)	26.38	1.754E-03	.0942	2.201E-03	2.133E-03	.1195	5.314E-03
M 5057(200)	26.38	1.754E-03	.0942	2.201E-03	2.133E-03	.1195	5.314E-03
T 9147(200)	28.41	1.640E-03	.0947	2.121E-03	2.056E-03	.1151	5.121E-03
S 2058(200)	28.41	1.640E-03	.0947	2.121E-03	2.056E-03	.1151	5.121E-03
M 5058(200)	28.41	1.640E-03	.0947	2.121E-03	2.056E-03	.1151	5.121E-03
T 9148(200)	31.71	1.633E-03	.0914	2.046E-03	1.986E-03	.1111	4.939E-03
S 2059(200)	31.71	1.633E-03	.0914	2.046E-03	1.986E-03	.1111	4.939E-03
M 5059(200)	31.71	1.633E-03	.0914	2.046E-03	1.986E-03	.1111	4.939E-03

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NASA-R1 ORBITER HEATING

AEDC (ARO, INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL R

VA289

GROUP CONFIG MODEL MACH NO PO (PSIA) TO (DEG R) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREBEND ROLL-MODEL YAW  
 42 2 ORBITER S 7.91 111.0 1259 30.01 -.01 -30.00 -180.00 -.00  
 T-1NF P-1NF Q-1NF V-1NF RHO-1NF MU-1NF RE/FT MREF STREF  
 (DEG R) (PSIA) (PSIA) (FT/SEC) (SLUGS/FT<sup>3</sup>) (LB-SEC/FT<sup>2</sup>) (FT-1) (R<sub>2</sub> .0175E1) (R<sub>2</sub> .0175E1)  
 93.1 .012 .536 37.1 1.102E-05 7.497E-08 5.495E 05 1.787E-02 5.474E-02  
 CAPEPA WOLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHO/CXK) TRAR (TO) BETA (TO)  
 TOP (T) 7420 200 78  
 SIDE (S) 7425  
 MOTION (B) 7505 1.693E-01 1.7358E-01

PIC NO	TIME	MELTIME	M (TO)	M (TO)/MREF	M (TO)/MREF	M (TO)/MREF	M (TO)/MREF	ST (TO)
T 914E(200)	31.74	30.46	1.632E-03	.0914	2.048E-03	.1147	1.985E-03	.1112
S 2859(200)	31.74	30.46	1.632E-03	.0914	2.048E-03	.1147	1.985E-03	.1112
T 914E(200)	31.74	32.49	1.581E-03	.0885	1.983E-03	.1110	1.922E-03	.1076
S 2860(200)	31.74	32.49	1.581E-03	.0885	1.983E-03	.1110	1.922E-03	.1076
M 5966(200)	33.76	32.49	1.541E-03	.0885	1.983E-03	.1110	1.922E-03	.1076
T 9150(200)	35.79	34.51	1.533E-03	.0858	1.924E-03	.1077	1.865E-03	.1044
S 2861(200)	35.79	34.51	1.533E-03	.0858	1.924E-03	.1077	1.865E-03	.1044
M 5967(200)	35.79	34.51	1.533E-03	.0858	1.924E-03	.1077	1.865E-03	.1044
MODEL HAS LEFT CENTERLINE								
T 9151(200)	37.82	36.54	1.490E-03	.0834	1.870E-03	.1047	1.813E-03	.1015
M 5068(200)	37.82	36.54	1.490E-03	.0834	1.870E-03	.1047	1.813E-03	.1015
S 2862(200)	37.84	36.54	1.490E-03	.0834	1.869E-03	.1046	1.812E-03	.1014

Group 43  
 75 05  
 EMOOL  
 MB

4528  
 $\alpha = 30^\circ$   
 $\phi = 0^\circ$

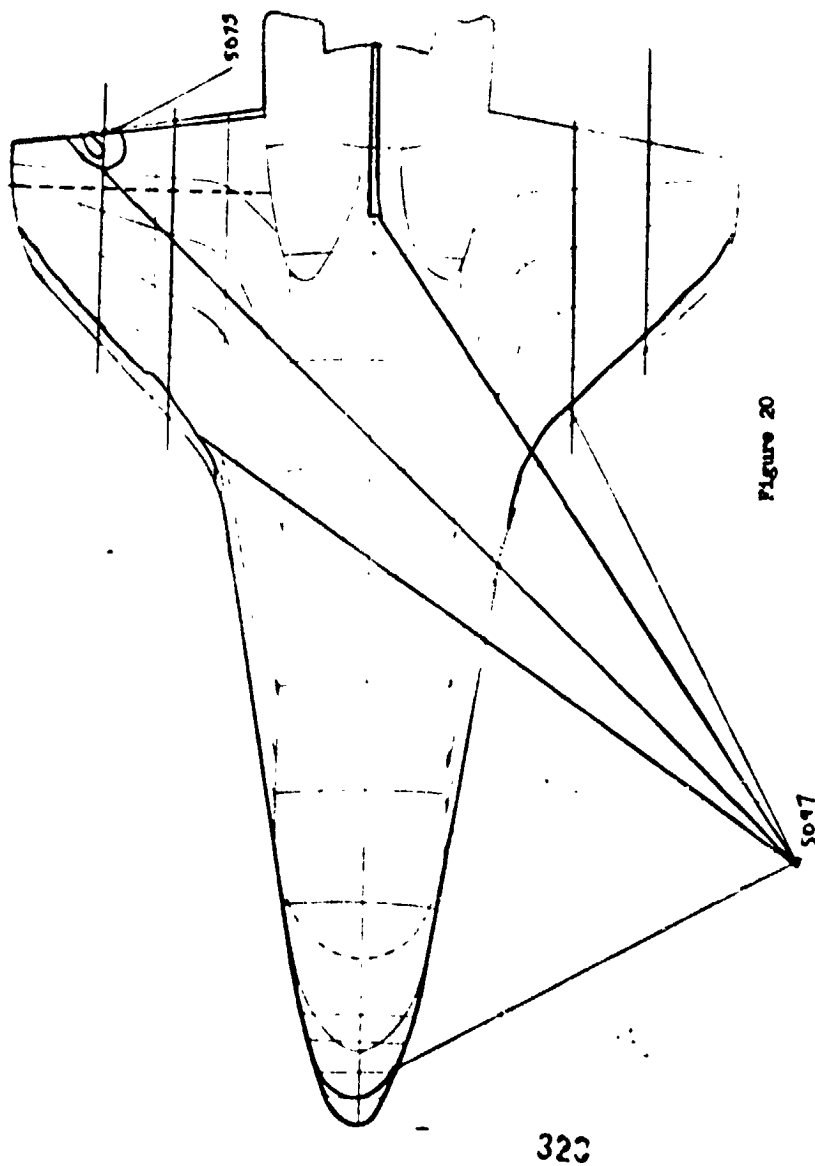


Figure 20

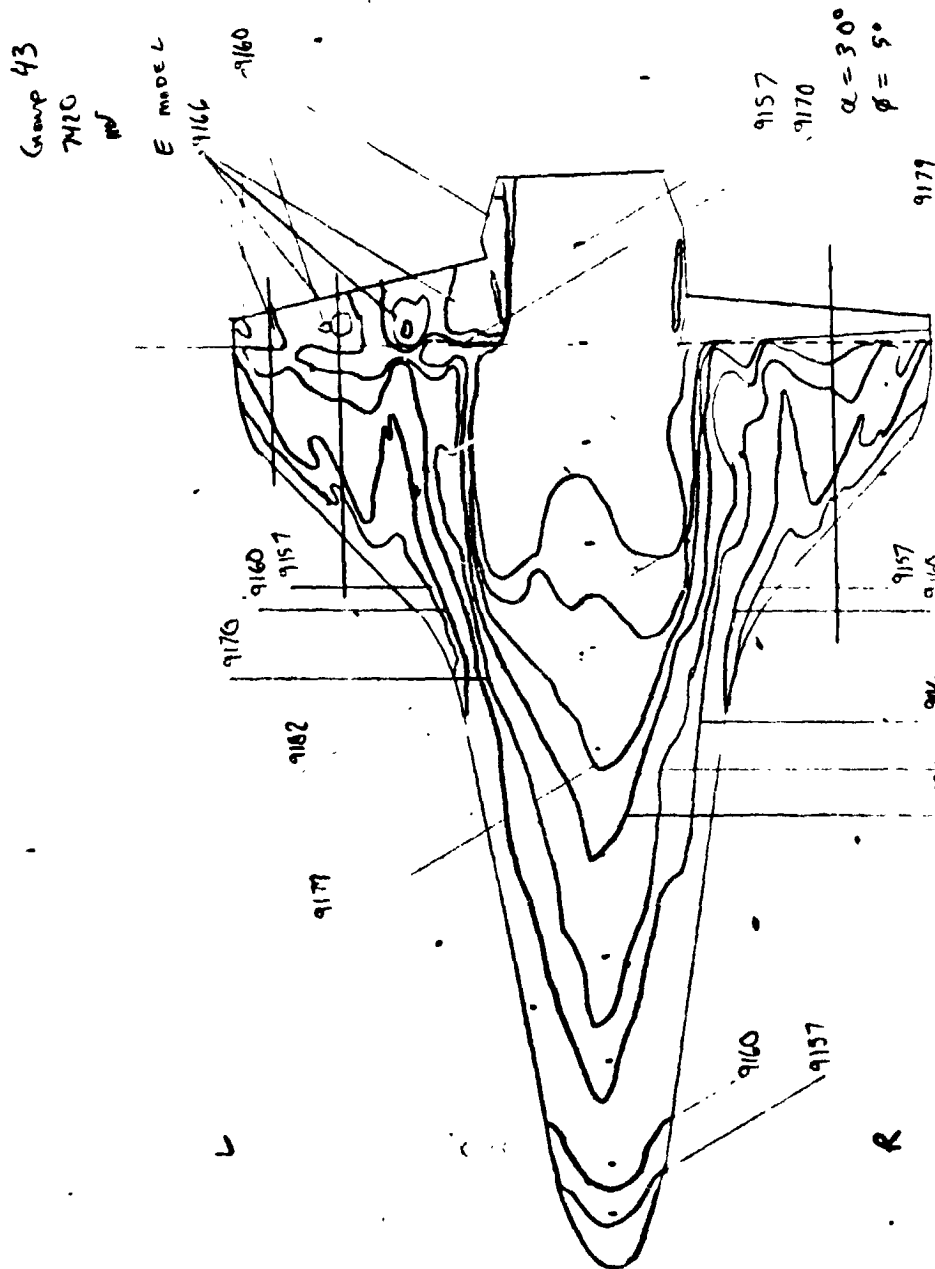


Figure 21

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NASA-RI ORBITER HEATING

AEDC(ARO, INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL #

VA2R9

GROUP	CONFIG	MODEL	MACH NO	PO(PSIA)	TO(DEG R)	ALPHA-MODEL	ALPHA-SECTOR	ALPHA-PREBEND	ROLL-MODEL	YAW
43	3	GREIFTH E	7.91	1111.1	1258	30.01	-0.01	-30.00	-180.00	-0.00
T-1NF	P-1NF	Q-1NF	V-1NF	RHO-1NF	MU-1NF	PF/FT	HRFF	STREF		
(DEG R)	(PSIA)	(FT/SEC)	(SLUGS/FT <sup>3</sup> )	(LR-SEC/FT <sup>2</sup> )	(EI-1)	(R <sub>2</sub> -0.175EI)	(R <sub>2</sub> -0.175EI)			
93.1	0.012	0.536	3739	1.103E-05	7.493E-08	5.507E 05	1.748E-02	5.469E-02		
CAMERA	HOLL NO	PAINT IFMP (DEG F)	INITIAL TEMP (DEG F)	SQUARE ROOT (RHOXCR)	TRAR(TO)	BETA(TO)				
TOP(1)	7420									
SIDE(5)	7425	150	78	0.0496						
MOTLOW(B)	7505									

PIC NO	TIME RELTIME	MITO)	MITO)/HRFF	MI.91TO)	MI.91TO)/HRFF	MI .912TO)	MI .912TO)/HRFF	ST(TO)
T 9154(150)	1.18	MODEL HAS NOT REACHED CENTERLINE						
S 2065(150)	1.18	MODEL HAS NOT REACHED CENTERLINE						
M 5071(150)	1.18	MODEL HAS NOT REACHED CENTERLINE						
T 9155(150)	2.25	MODEL HAS NOT REACHED CENTERLINE						
S 2066(150)	2.25	MODEL HAS NOT REACHED CENTERLINE						
M 5072(150)	2.25	MODEL HAS NOT REACHED CENTERLINE						
INJECT TIME =	2.29							
T 9156(150)	3.23	DATA NOT YET VALID						
S 2067(150)	3.23	DATA NOT YET VALID						
M 5073(150)	3.23	DATA NOT YET VALID						
T 9154(150)	4.38	3.14	2.712E-03	.1514	3.348E-03	.1469	3.253E-03	.1816
S 2065(150)	4.41	3.13	2.701E-03	.1509	3.335E-03	.1463	3.240E-03	.1810
M 5071(150)	4.41	3.13	2.701E-03	.1509	3.335E-03	.1463	3.240E-03	.1810
T 9154(150)	5.46	4.18	2.316E-03	.1305	2.885E-03	.1411	2.803E-03	.1566
S 2066(150)	5.46	4.18	2.316E-03	.1305	2.885E-03	.1411	2.803E-03	.1566
M 5072(150)	5.46	4.18	2.316E-03	.1305	2.885E-03	.1411	2.803E-03	.1566
T 9154(150)	6.53	4.24	2.329E-03	.1300	2.876E-03	.1406	2.794E-03	.1560
S 2065(150)	6.53	4.25	2.329E-03	.1300	2.876E-03	.1406	2.794E-03	.1560
M 5073(150)	6.53	4.25	2.329E-03	.1300	2.876E-03	.1406	2.794E-03	.1560
T 9154(150)	6.56	5.28	2.078E-03	.1163	2.572E-03	.1436	2.499E-03	.1395
S 2066(150)	6.56	5.28	2.078E-03	.1163	2.572E-03	.1436	2.499E-03	.1395
M 5073(150)	6.56	5.28	2.078E-03	.1163	2.572E-03	.1436	2.499E-03	.1395
T 9154(150)	7.61	6.33	1.848E-03	.1059	2.344E-03	.1308	2.277E-03	.1271
S 2065(150)	7.61	6.33	1.848E-03	.1059	2.344E-03	.1308	2.277E-03	.1271
M 5073(150)	7.61	6.33	1.848E-03	.1059	2.344E-03	.1308	2.277E-03	.1271
T 9154(150)	8.68	7.41	1.755E-03	.0980	2.167E-03	.1210	2.105E-03	.1175
S 2066(150)	8.68	7.41	1.755E-03	.0980	2.167E-03	.1210	2.105E-03	.1175
M 5073(150)	8.68	7.41	1.755E-03	.0980	2.167E-03	.1210	2.105E-03	.1175
T 9154(150)	9.74	8.46	1.642E-03	.0917	2.027E-03	.1132	1.970E-03	.1100

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# NASA-RI ORBITER HEATING

AEDC(ARJ, INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL R

VA249

GROUP CONFIG MODEL MACH NO P(PSIA) T(DEG R) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREBEND ROLL-MODEL YAW  
 43 3 ORBITER E 7.91 111.3 1259 30.01 -.01 -30.01 -180.00 -.00

T-INF Q-INF V-INF MU-INF MU-INF RE/F1 MREF STREF  
 (DEG R) (PSIA) (FT/SEC) (SLUGS/FT<sup>3</sup>) (LB-SEC/FT<sup>2</sup>) (BT-LB) (BT-LB) (BT-LB) (BT-LB)

93.1 -.012 .539 3739 1.106E-05 7.493F-08 5.521E 05 1.790E-02 5.462E-02

CAPRA MOLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHOXCX) T8AR(TOI) BETA(TOI)  
 TOP(IT) 7420 78  
 STP(S) 7425  
 MOLL(MB) 7505 .0496 9.999E-02 9.6273E-02

PIC NO	TIME DELTIME	M(TOI)	M(TOI)/MREF	M(910)	M(910)/MREF	M(912TO)	M(912TO)/MREF	ST(TOI)
T 9162(150)	9.76	0.48	0.015	2.024E-03	0.015	1.967E-03	0.015	4.944E-03
S 2473(150)	9.76	0.48	0.015	2.024E-03	0.015	1.967E-03	0.015	4.944E-03
T 9163(150)	10.21	9.53	0.083	1.910E-03	0.083	1.855E-03	0.083	4.643E-03
M 5080(150)	10.21	9.53	0.083	1.910E-03	0.083	1.855E-03	0.083	4.643E-03
S 2474(150)	10.24	9.56	0.082	1.907E-03	0.082	1.853E-03	0.082	4.637E-03
T 9164(150)	11.69	10.61	0.081	1.810E-03	0.081	1.759E-03	0.081	4.420E-03
S 2475(150)	11.69	10.61	0.081	1.810E-03	0.081	1.759E-03	0.081	4.420E-03
M 5081(150)	11.69	10.61	0.081	1.810E-03	0.081	1.759E-03	0.081	4.420E-03
T 9165(150)	12.56	11.69	0.080	1.725E-03	0.080	1.676E-03	0.080	4.212E-03
S 2476(150)	12.56	11.69	0.080	1.725E-03	0.080	1.676E-03	0.080	4.212E-03
M 5082(150)	12.56	11.69	0.080	1.725E-03	0.080	1.676E-03	0.080	4.212E-03
T 9166(150)	14.04	12.76	0.076	1.650E-03	0.076	1.604E-03	0.076	4.023E-03
S 2477(150)	14.04	12.76	0.076	1.650E-03	0.076	1.604E-03	0.076	4.023E-03
M 5083(150)	14.04	12.76	0.076	1.650E-03	0.076	1.604E-03	0.076	4.023E-03
T 9167(150)	15.09	13.81	0.071	1.585E-03	0.071	1.541E-03	0.071	3.863E-03
S 2478(150)	15.12	13.84	0.071	1.585E-03	0.071	1.541E-03	0.071	3.863E-03
M 5084(150)	15.12	13.84	0.071	1.585E-03	0.071	1.541E-03	0.071	3.863E-03
T 9168(150)	16.17	14.89	0.069	1.528E-03	0.069	1.485E-03	0.069	3.725E-03
S 2479(150)	16.17	14.89	0.069	1.528E-03	0.069	1.485E-03	0.069	3.725E-03
M 5085(150)	16.17	14.89	0.069	1.528E-03	0.069	1.485E-03	0.069	3.725E-03
T 9169(150)	17.24	15.97	0.066	1.476E-03	0.066	1.434E-03	0.066	3.593E-03
S 2480(150)	17.24	15.97	0.066	1.476E-03	0.066	1.434E-03	0.066	3.593E-03
M 5086(150)	17.24	15.97	0.066	1.476E-03	0.066	1.434E-03	0.066	3.593E-03
T 9170(150)	18.22	17.04	0.065	1.428E-03	0.065	1.388E-03	0.065	3.479E-03
S 2481(150)	18.22	17.04	0.065	1.428E-03	0.065	1.388E-03	0.065	3.479E-03
M 5087(150)	18.22	17.04	0.065	1.428E-03	0.065	1.388E-03	0.065	3.479E-03

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7/ 9/73

## NASA-K1 ORBITER HEATING

AEDC/ARO, INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL #

VA299

GROUP CONFIG MODEL MACH NO PO (PSIA) TO (CLG R) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREBEND ROLL-MODEL YAW  
 43 3 ORBITER E 7.91 111.8 1258 30.01 -.01 -30.00 -180.00 -.00  
 T-INF P-INF Q-INF V-INF RMO-INF MU-INF RE/FT MREF STREF  
 (DEG R) (PSIA) (PSIA) (FT/SEC) (SLUGS/FT<sup>3</sup>) (LB-SEC/FT<sup>2</sup>) (FT-L) (R=.0175EI) (R=.0175EI)  
 93.1 .012 .540 3740 1.111E-05 7.495E-08 5.545E 05 1.794E-02 5.450E-02

CAMERA ROLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHO/CXK) TBAR(TO) BETA(TO)  
 TOP(T) 7420 150 78 .0494 9.999E-02 9.6273E-02  
 SIDF(S) 7425  
 MOTIM(B) 7505

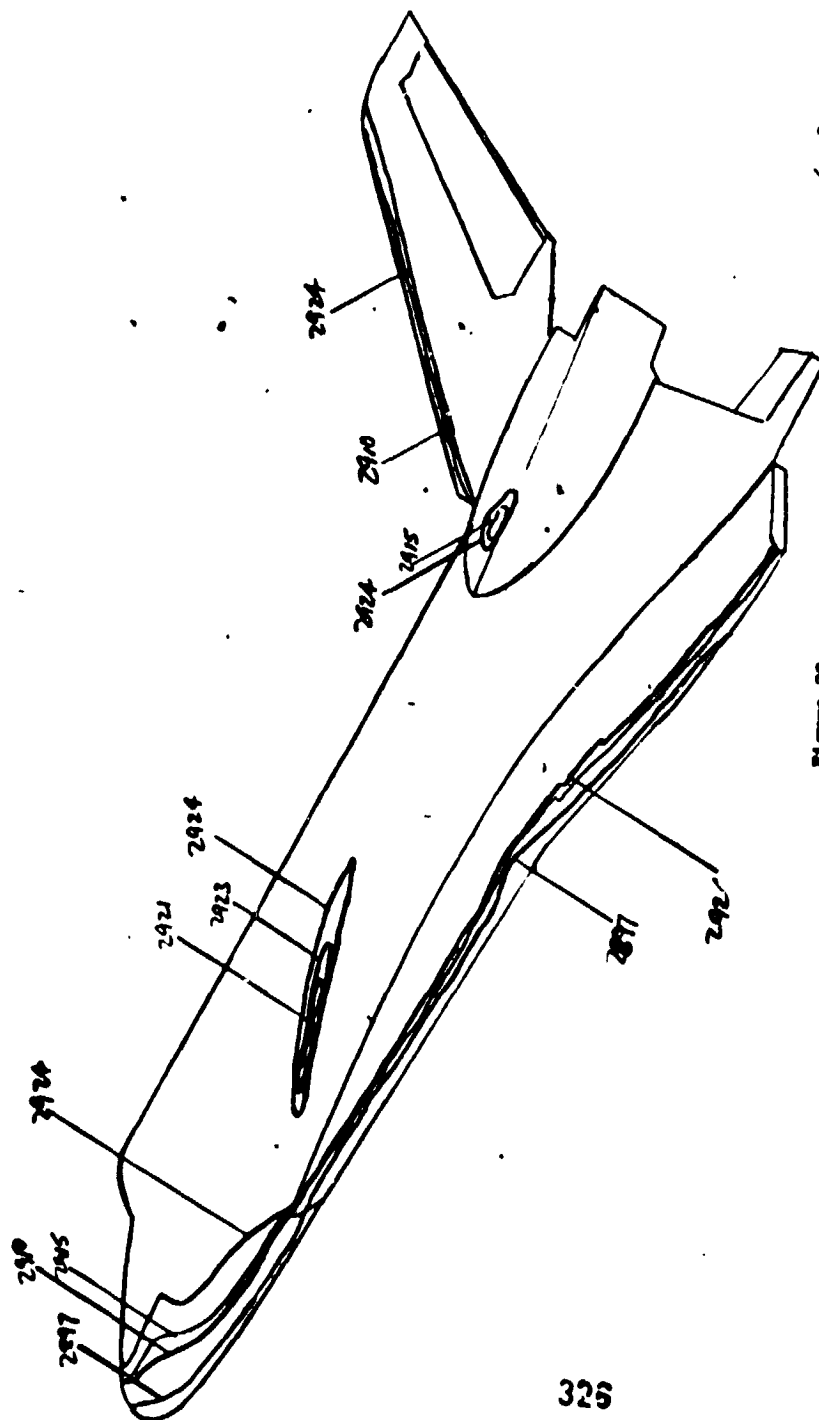
PIC NO TIME DELTIME H1(TO) H1(TO)/HREF M1(.910) M1(.910)/HREF M1(.912TO) M1(.912TO)/HREF ST(TO)  
 T 9171(150) 19.37 18.09 1.123E-03 .0624 1.346E-03 .0771 1.347E-03 .0749 3.361E-03  
 M 5084(150) 19.37 18.09 1.123E-03 .0624 1.346E-03 .0771 1.347E-03 .0749 3.361E-03  
 S 2042(150) 19.40 18.12 1.122E-03 .0625 1.345E-03 .0772 1.346E-03 .0750 3.373E-03  
 T 9172(150) 20.45 18.17 1.091E-03 .0608 1.337E-03 .0750 1.308E-03 .0729 3.280E-03  
 M 5085(150) 20.45 18.17 1.091E-03 .0608 1.337E-03 .0750 1.308E-03 .0729 3.280E-03  
 S 2043(150) 20.47 18.19 1.090E-03 .0607 1.346E-03 .0749 1.308E-03 .0728 3.272E-03  
 T 9173(150) 21.52 20.25 1.061E-03 .0591 1.310E-03 .0730 1.273E-03 .0709 3.186E-03  
 M 5086(150) 21.52 20.25 1.061E-03 .0591 1.310E-03 .0730 1.273E-03 .0709 3.186E-03  
 S 2044(150) 21.52 20.25 1.061E-03 .0591 1.310E-03 .0730 1.273E-03 .0709 3.186E-03  
 T 9174(150) 22.60 21.32 1.034E-03 .0576 1.277E-03 .0711 1.241E-03 .0691 3.104E-03  
 M 5087(150) 22.60 21.32 1.034E-03 .0576 1.277E-03 .0711 1.241E-03 .0691 3.104E-03  
 S 2045(150) 22.60 21.32 1.034E-03 .0576 1.277E-03 .0711 1.241E-03 .0691 3.104E-03  
 T 9175(150) 24.00 22.72 1.002E-03 .0559 1.237E-03 .0689 1.202E-03 .0669 3.004E-03  
 M 5088(150) 24.00 22.72 1.002E-03 .0559 1.237E-03 .0689 1.202E-03 .0669 3.004E-03  
 S 2046(150) 24.00 22.72 1.002E-03 .0559 1.237E-03 .0689 1.202E-03 .0669 3.004E-03  
 T 9176(150) 26.03 24.75 9.546E-04 .0535 1.194E-03 .0660 1.151E-03 .0641 2.884E-03  
 M 5093(150) 26.03 24.75 9.546E-04 .0535 1.194E-03 .0660 1.151E-03 .0641 2.884E-03  
 S 2047(150) 26.05 24.78 9.543E-04 .0534 1.195E-03 .0659 1.151E-03 .0641 2.877E-03  
 T 9177(150) 28.06 26.78 9.248E-04 .0513 1.139E-03 .0634 1.107E-03 .0616 2.765E-03  
 M 5094(150) 28.06 26.78 9.248E-04 .0513 1.139E-03 .0634 1.107E-03 .0616 2.765E-03  
 S 2048(150) 28.06 26.78 9.248E-04 .0513 1.139E-03 .0634 1.107E-03 .0616 2.765E-03  
 T 9178(150) 30.11 28.87 8.843E-04 .0495 1.094E-03 .0611 1.067E-03 .0594 2.667E-03  
 M 5095(150) 30.11 28.87 8.843E-04 .0495 1.094E-03 .0611 1.067E-03 .0594 2.667E-03  
 S 2049(150) 30.13 28.84 8.844E-04 .0494 1.094E-03 .0610 1.066E-03 .0593 2.661E-03  
 T 9179(150) 32.14 30.84 8.546E-04 .0478 1.061E-03 .0590 1.031E-03 .0574 2.576E-03  
 M 5096(150) 32.14 30.84 8.546E-04 .0478 1.061E-03 .0590 1.031E-03 .0574 2.576E-03

187

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324



$\alpha = 30^\circ$ 

**22**

Group 1  
7505  
W

$\alpha = 30^\circ$   
 $\phi = 1^\circ$

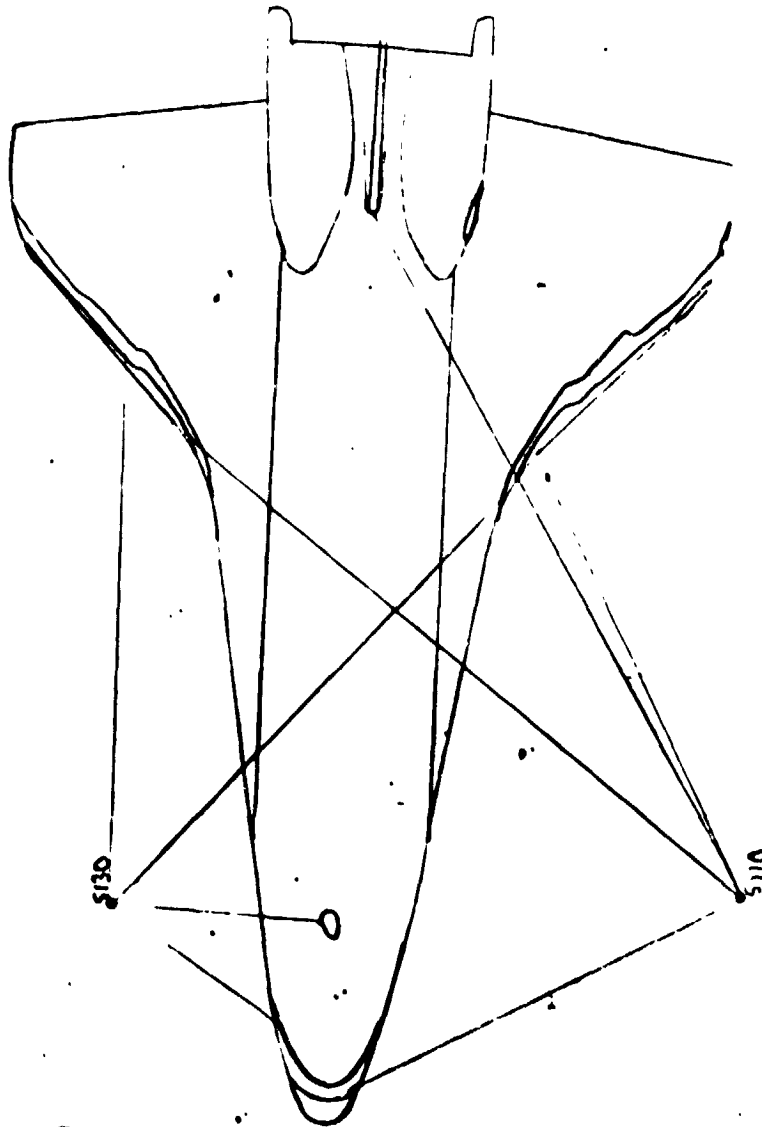


Figure 23

Group 84  
1478  
nd

$\alpha = 30$   
 $\phi = 1$

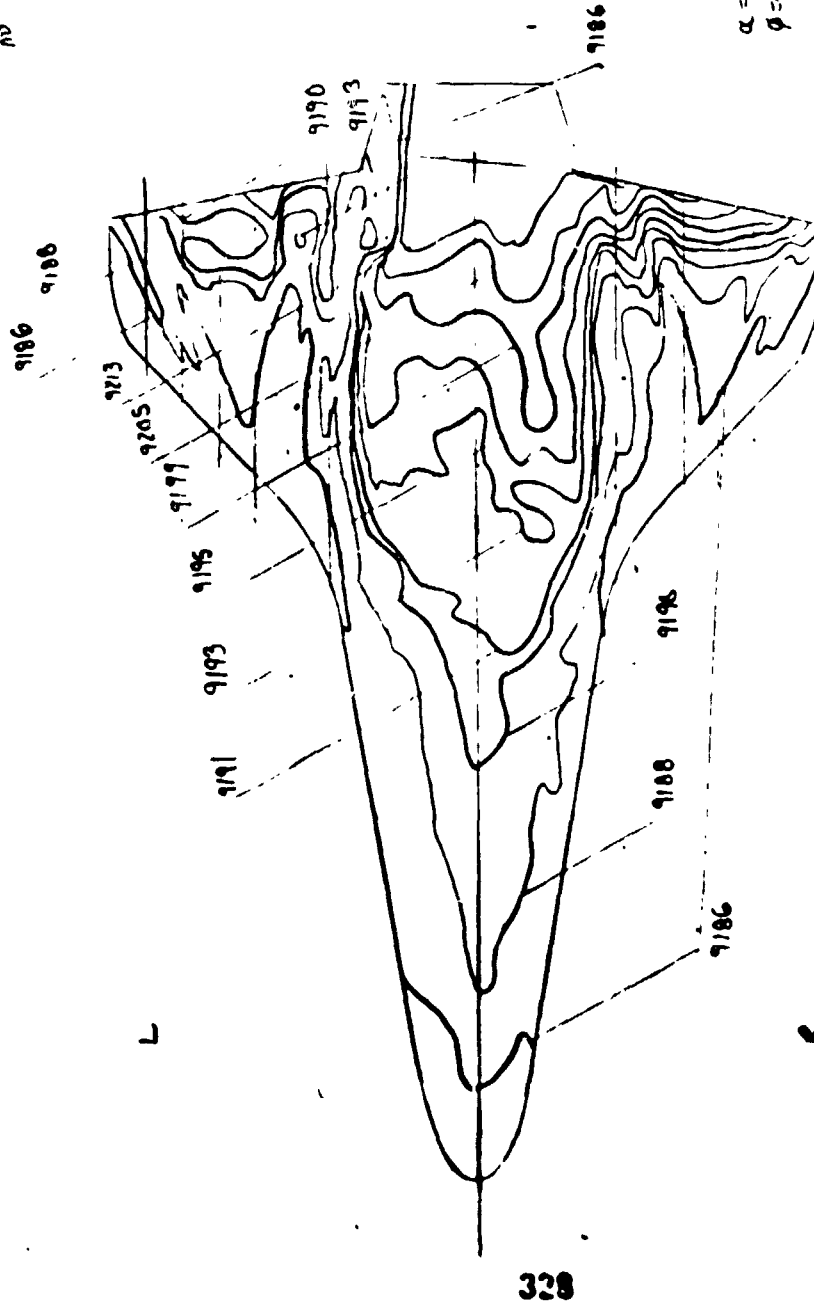


Figure 24



71 9173

MEDICAL, INC. 1 ARNOLD AFS, TENNESSEE  
 VON KARMAN CAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL A

AW 1-00

(PSIA)	TO (DEG H)	ALPHA-MODEL	ALPHA-MODEL
11.1	175H	29.99	

AW 1-00

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03:5155V7241

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NASA-R1 ORBITER PEATING

VA289

AEDC(ARO, INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL R

GROUP CONFIG MODEL MACH NO PO(PSTA) TO(IDEGR) ALPHA-MODEL ALPHA-SECTION ALPHA-PREBEND ROLL-MODEL YAW  
 44 2 ORBITER S 7.91 111.3 125H 20.99 -.01 -30.00 -182.00 1.00

T-INF P-INF Q-INF V-INF RHO-INF MU-INF RF/FT HREF STREF  
 (DEG R) (PSIA) (FT/SEC) (SLUGS/FT<sup>3</sup>) (LB-SEC/FT<sup>2</sup>) (FT-1) (IN<sup>2</sup> .0175FT<sup>2</sup>) (IN<sup>2</sup> .0175FT<sup>2</sup>)  
 '3.1 .012 .534 3740 1.106E-05 7.495E-08 5.519E 05 1.700E-02 5.462E-02

CAMERA HOLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (PHOACXK) TRAR(ITO) BETA(ITO)  
 TOP(IT) 7420  
 SIDE(S) 7425  
 BOTTOM(B) 7505

7.103E-02 6.6690E-02

PIC NO	TIME DELTIME	M(10)	H(10)/HREF	M(.910)	H(.910)/HREF	M(.91210)	H(.91210)/HREF	ST(ITO)
M 5117(131)	19.27	7.641E-04	.0426	9.385E-04	.0524	9.129E-04	.0509	2.307E-03
T 9200(131)	19.30	7.646E-04	.0426	9.374E-04	.0524	9.123E-04	.0510	2.309E-03
S 2911(131)	19.30	7.635E-04	.0426	9.374E-04	.0524	9.123E-04	.0510	2.309E-03
T 9201(131)	20.35	7.422E-04	.0415	9.116E-04	.0509	8.868E-04	.0495	2.244E-03
M 5114(131)	20.35	7.422E-04	.0415	9.116E-04	.0509	8.868E-04	.0495	2.244E-03
S 2912(131)	20.37	7.417E-04	.0414	9.110E-04	.0509	8.862E-04	.0495	2.241E-03
T 9202(131)	21.42	7.221E-04	.0403	8.869E-04	.0495	8.628E-04	.0482	2.182E-03
S 2913(131)	21.42	7.221E-04	.0403	8.869E-04	.0495	8.628E-04	.0482	2.182E-03
M 5119(131)	21.42	7.221E-04	.0403	8.869E-04	.0495	8.628E-04	.0482	2.182E-03
T 9203(131)	22.43	7.040E-04	.0393	8.646E-04	.0483	8.411E-04	.0470	2.127E-03
M 5120(131)	22.48	7.040E-04	.0393	8.646E-04	.0483	8.411E-04	.0470	2.127E-03
S 2914(131)	22.50	7.036E-04	.0393	8.641E-04	.0483	8.406E-04	.0469	2.128E-03
T 9204(131)	23.55	6.868E-04	.0383	8.435E-04	.0471	8.205E-04	.0458	2.075E-03
S 2915(131)	23.55	6.868E-04	.0383	8.435E-04	.0471	8.205E-04	.0458	2.075E-03
M 5121(131)	23.55	6.868E-04	.0383	8.435E-04	.0471	8.205E-04	.0458	2.075E-03
T 9205(131)	24.60	6.711E-04	.0374	8.247E-04	.0460	8.014E-04	.0447	2.026E-03
M 5122(131)	24.63	6.707E-04	.0375	8.238E-04	.0460	8.014E-04	.0447	2.026E-03
S 2916(131)	24.63	6.707E-04	.0375	8.238E-04	.0460	8.014E-04	.0447	2.026E-03
T 9206(131)	25.68	6.561E-04	.0366	8.059E-04	.0450	7.839E-04	.0438	1.984E-03
M 5123(131)	25.68	6.561E-04	.0366	8.059E-04	.0450	7.839E-04	.0438	1.984E-03
S 2917(131)	25.70	6.557E-04	.0366	8.055E-04	.0449	7.835E-04	.0437	1.980E-03
T 9207(131)	26.76	6.421E-04	.0358	7.847E-04	.0440	7.672E-04	.0428	1.938E-03
M 5124(131)	26.76	6.421E-04	.0358	7.847E-04	.0440	7.672E-04	.0428	1.938E-03
S 2918(131)	26.76	6.421E-04	.0358	7.847E-04	.0440	7.672E-04	.0428	1.938E-03
T 9208(131)	27.81	6.243E-04	.0351	7.729E-04	.0431	7.518E-04	.0420	1.900E-03
M 5125(131)	27.81	6.243E-04	.0351	7.729E-04	.0431	7.518E-04	.0420	1.900E-03

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NASA-R1 ORBITER HEATING

ACDC(ARO,INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL R

VA289

GROUP CONFIG MODEL MACH NO PO(PSIA) TO(DEG R) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREBEND ROLL-MODEL YAW  
 44 2 GREITER S 7.91 111.5 1258 29.99 -.01 -30.00 -182.00 1.00

T-INF P-INF Q-INF V-INF RMN-INF MU-INF HREF STREF  
 (DEG R) (PSIA) (PSIA) (PSIA) (FT/SEC) (SLUGS/FT<sup>2</sup>) (LBS-SEC/FT<sup>2</sup>) (LBS-SEC/FT<sup>2</sup>) (R= .0175E) (R= .0175E)

93.1 .012 .539 37.0 1.109E-05 7.496E-09 5.529E 05 1.702E-02 5.459E-02

CAMERA HOLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHOXCK) TRAR(TO) BETA(TO)

TOP(T) 7420 131 A0 .0484 7.103E-02 6.6690E-02

SINP(S) 7425

MOT(MIB) 7505

PIC NO	TIME RELTIME	H(TO)	H(TO)/HREF	H(.9TO)	H(.9TO)/HREF	H(.912TO)	H(.912TO)/HREF	ST(TO)
S 2919(131)	27.03	6.290E-04	.0351	7.725E-04	.0431	7.515E-04	.0420	1.900E-03
T 9209(131)	28.08	6.169E-04	.0344	7.577E-04	.0423	7.370E-04	.0411	1.862E-03
S 2920(131)	28.08	6.169E-04	.0344	7.577E-04	.0423	7.370E-04	.0411	1.862E-03
M 5126(131)	28.08	6.169E-04	.0344	7.577E-04	.0423	7.370E-04	.0411	1.862E-03
T 9210(131)	30.11	6.036E-04	.0337	7.414E-04	.0414	7.212E-04	.0403	1.824E-03
M 5127(131)	30.11	6.036E-04	.0337	7.414E-04	.0414	7.212E-04	.0403	1.824E-03
S 2921(131)	30.13	6.014E-04	.0337	7.411E-04	.0414	7.209E-04	.0402	1.821E-03
M 5128(131)	32.14	5.835E-04	.0326	7.166E-04	.0400	6.971E-04	.0389	1.761E-03
T 9211(131)	32.16	5.832E-04	.0326	7.163E-04	.0400	6.968E-04	.0389	1.762E-03
M 5129(131)	32.16	5.832E-04	.0326	7.163E-04	.0400	6.968E-04	.0389	1.762E-03
S 2922(131)	34.19	5.620E-04	.0315	6.942E-04	.0387	6.753E-04	.0377	1.705E-03
T 9212(131)	34.19	5.620E-04	.0315	6.942E-04	.0387	6.753E-04	.0377	1.705E-03
S 2923(131)	36.22	5.650E-04	.0315	6.934E-04	.0387	6.750E-04	.0377	1.705E-03
T 9213(131)	36.22	5.643E-04	.0306	6.735E-04	.0376	6.551E-04	.0366	1.655E-03
M 5130(131)	36.22	5.643E-04	.0306	6.735E-04	.0376	6.551E-04	.0366	1.655E-03
T 9214(131)	38.24	5.331E-04	.0297	6.548E-04	.0365	6.369E-04	.0355	1.609E-03
S 2925(131)	38.24	5.331E-04	.0297	6.548E-04	.0365	6.369E-04	.0355	1.609E-03
M 5131(131)	38.24	5.331E-04	.0297	6.548E-04	.0365	6.369E-04	.0355	1.609E-03
MODEL HAS LEFT CENTERLINE								
T 9215(131)	40.27	5.140E-04	.0290	6.375E-04	.0356	6.201E-04	.0346	1.567E-03
M 5132(131)	40.27	5.140E-04	.0290	6.375E-04	.0356	6.201E-04	.0346	1.567E-03
S 2926(131)	40.30	5.149E-04	.0289	6.373E-04	.0355	6.199E-04	.0346	1.565E-03

Group 45  
7505

4528  
 $\alpha = 30^\circ$   
 $\phi = 0^\circ$

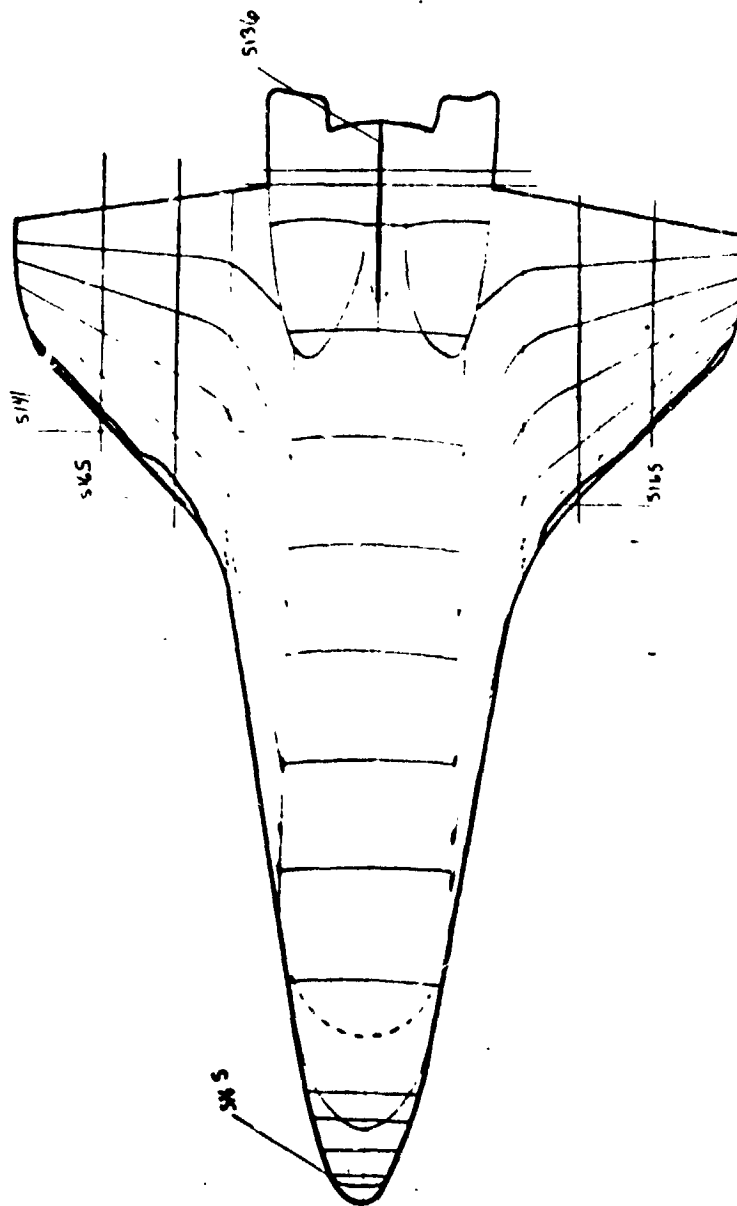


Figure 25

Group 45  
7420  
m2

8595  
 $\alpha = 30^\circ$   
 $\phi = 0^\circ$

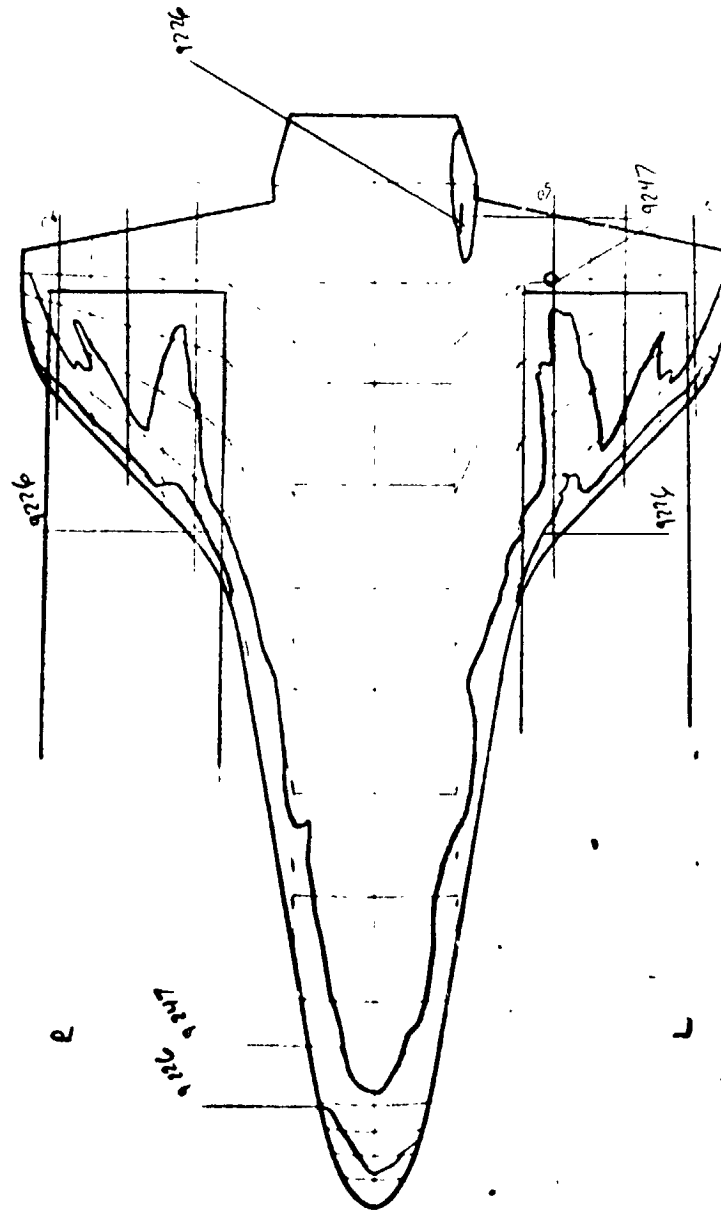


Figure 26

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NASA-RI ORBITER HEATING AEDC(ARO, INC.) ARNOLD AFS, TENNESSEE  
 VON KAHN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL R

VA299

GROUP COMFIC MODEL MACH NO PO(PSIA) TO(DEG R) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREBEND ROLL-MODEL YAW  
 45 7 ORBITER R4 7.91 110.0 1259 30.01 RE/FT STREF  
 T-INF P-INF Q-INF RHO-INF MU-INF MRFF MRFF STREF  
 (OFC R) (PSIA) (FT/SEC) (LBS/SEC/FT) (LBS/SEC/FT) (FT-1) (R= .0175FI) (R= .0175FI)  
 93.2 .012 .531 3747 1.091E-05 7.501E-08 5.442E-05 1.779E-02 5.500E-02  
 CAMERA ROLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHO/CKK) TBAR(TO) BETAITO)  
 TOP(T) 7420  
 SIDF(S) 7425  
 MOTTCM(R) 7505  
 250 80 .0535 0 0

PIC NO TIME DELTIME H(TO) H(TO)/MREF H(.910) H(.910)/MREF H(.912) H(.912)/MREF H(.912)/MREF ST(TO)  
 T 9216(250) 1.08 MODEL HAS NOT REACHED CENTERLINE  
 S 2921(250) 1.10 MODEL HAS NOT REACHED CENTERLINE  
 M 5131(250) 1.10 MODEL HAS NOT REACHED CENTERLINE  
 T 9217(250) 2.23 MODEL HAS NOT REACHED CENTERLINE  
 S 2928(250) 2.25 MODEL HAS NOT REACHED CENTERLINE  
 M 5131(250) 2.25 MODEL HAS NOT REACHED CENTERLINE  
 INJECT TIME = 2.30

T 9216(250) 3.20 DATA NOT YET VALID  
 S 2929(250) 3.20 DATA NOT YET VALID  
 M 5135(250) 3.20 DATA NOT YET VALID

T 9216(250) 3.23 7.842E-03 .4431 1.010E-02 .5668 9.756E-03 .5477 2.398E-02  
 S 2930(250) 4.38 7.842E-03 .4431 1.010E-02 .5668 9.756E-03 .5477 2.398E-02  
 M 5134(250) 4.38 7.842E-03 .4431 1.010E-02 .5668 9.756E-03 .5477 2.398E-02  
 T 9220(250) 5.43 6.816E-03 .3825 8.720E-03 .4893 8.428E-03 .4729 2.069E-02  
 M 5131(250) 5.43 6.816E-03 .3825 8.720E-03 .4893 8.428E-03 .4729 2.069E-02  
 T 9231(250) 5.46 6.746E-03 .3815 8.693E-03 .4881 8.401E-03 .4717 2.065E-02  
 S 2921(250) 6.51 6.072E-03 .3408 7.746E-03 .4359 7.506E-03 .4213 1.843E-02  
 M 5134(250) 6.51 6.072E-03 .3408 7.746E-03 .4359 7.506E-03 .4213 1.843E-02  
 T 9222(250) 7.56 5.539E-03 .3107 7.086E-03 .3975 6.848E-03 .3841 1.680E-02  
 S 2933(250) 7.56 5.539E-03 .3107 7.086E-03 .3975 6.848E-03 .3841 1.680E-02  
 M 5135(250) 7.58 5.528E-03 .3104 7.072E-03 .3971 6.834E-03 .3837 1.680E-02  
 T 9223(250) 8.63 7.34 5.117E-03 .2873 6.546E-03 .3676 6.326E-03 .3552 1.555E-02  
 S 2934(250) 8.63 7.34 5.117E-03 .2873 6.546E-03 .3676 6.326E-03 .3552 1.555E-02  
 M 5140(250) 8.63 7.34 5.109E-03 .2866 6.535E-03 .3666 6.315E-03 .3543 1.550E-02  
 T 9224(250) 9.71 8.42 4.779E-03 .2681 6.114E-03 .3429 5.908E-03 .3314 1.450E-02  
 S 2935(250) 9.71 8.42 4.779E-03 .2681 6.114E-03 .3429 5.908E-03 .3314 1.450E-02  
 M 5141(250) 9.71 8.42 4.779E-03 .2681 6.114E-03 .3429 5.908E-03 .3314 1.450E-02

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7/ 9/73

NASA-MI ORBITER HEATING

AEDC(ARO-INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL R

VA2R9

GROUP CNFIC MODEL MACH NO PO(PISA) TO(DEG R) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREBEND ROLL-MODEL YAW  
 45 7 ORBITER R4 7.91 110.4 1259 30.01 -0.01 -30.00 -180.00 -0.00

T-INF P-INF O-INF V-INF MU-INF RHO-INF RF/FT MREF STREF  
 (DEG R) (PSIA) (PSIA) (FT/SEC) (SLUGS/FT<sup>3</sup>) (LB-SEC/FT<sup>2</sup>) (F/L) (HR) (0.175E1) (HR) (0.175E1)  
 93.2 .012 .533 37.2 1.095E-05 7.503E-08 5.462E 05 1.783E-02 5.490E-02

CAMERA ROLL NO PAINT IFMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHOXCAK) TRAR(TC) B-TA(TO)  
 TOP(1) 7420  
 SIDE(S) 7425  
 MOTICH(R) 7505

PIC NO	TIME	MELTIME	M(TO)/MREF	M(1.9T0)/HR, F	M(1.9T0)	M(1.9T0)/MREF	ST(TO)
T 9225(1250)	10.76	9.47	.2528	5.764E-03	.3234	5.570E-03	1.367E-02
M 5142(1250)	10.76	9.47	.2528	5.764E-03	.3234	5.570E-03	1.367E-02
S 2936(1250)	10.79	9.49	.2523	5.757E-03	.3231	5.563E-03	1.366E-02
T 9226(1250)	11.84	10.55	.2395	5.427E-03	.3064	5.279E-03	1.295E-02
M 5143(1250)	11.84	10.55	.2395	5.427E-03	.3064	5.279E-03	1.295E-02
S 2937(1250)	11.84	10.55	.2395	5.427E-03	.3064	5.279E-03	1.295E-02
T 9227(1250)	12.89	11.60	.2282	5.209E-03	.2919	5.034E-03	1.233E-02
M 5144(1250)	12.89	11.60	.2282	5.209E-03	.2919	5.034E-03	1.233E-02
S 2938(1250)	12.91	11.62	.2282	5.203E-03	.2919	5.028E-03	1.234E-02
T 9228(1250)	13.57	12.67	.2194	4.983E-03	.2794	4.815E-03	1.180E-02
M 5145(1250)	13.57	12.67	.2194	4.983E-03	.2794	4.815E-03	1.180E-02
S 2939(1250)	13.59	12.70	.2192	4.974E-03	.2791	4.810E-03	1.179E-02
T 9229(1250)	15.04	13.75	.2076	4.784E-03	.2681	4.623E-03	1.132E-02
M 5146(1250)	15.04	13.75	.2076	4.784E-03	.2681	4.623E-03	1.132E-02
S 2940(1250)	15.04	13.75	.2076	4.784E-03	.2681	4.623E-03	1.132E-02
T 9230(1250)	16.09	14.80	.2019	4.611E-03	.2583	4.456E-03	1.090E-02
M 5147(1250)	16.09	14.80	.2019	4.611E-03	.2583	4.456E-03	1.090E-02
S 2941(1250)	16.12	14.83	.2019	4.607E-03	.2583	4.452E-03	1.091E-02
T 9231(1250)	17.17	15.88	.1950	4.452E-03	.2495	4.302E-03	1.054E-02
M 5148(1250)	17.17	15.88	.1950	4.452E-03	.2495	4.302E-03	1.054E-02
S 2942(1250)	17.17	15.88	.1950	4.452E-03	.2495	4.302E-03	1.054E-02
T 9232(1250)	18.22	16.93	.1888	4.311E-03	.2415	4.166E-03	1.020E-02
M 5149(1250)	18.22	16.93	.1887	4.308E-03	.2414	4.163E-03	1.020E-02
S 2943(1250)	18.25	16.95	.1887	4.304E-03	.2414	4.163E-03	1.020E-02
T 9233(1250)	19.30	18.00	.1832	4.181E-03	.2344	4.040E-03	9.903E-03
M 5150(1250)	19.30	18.00	.1832	4.181E-03	.2344	4.040E-03	9.903E-03

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AEDC(ARO-INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL R

NASA-R1 ORBITER HEATING

VA289

GROUP CONFIG MODEL MACH NO PO(P51A) TO(DEG H) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREBEND ROLL-MODEL YAW

45 7 ORBITER R4 7.91 110.5 1259 30.01 -0.01 -30.00 -180.00 -0.00

T-INF P-INF Q-INF V-INF MU-INF RE/FT HREF STREF

(DEG R) (PSIA) (PSIA) (FI/SEC) (SLUGS/FI3) (LB-SEC/FI2) (EI-1) (R-0175EI) (R-0175EI)

93.2 .012 .533 37.2 1.006E-05 7.503F-04 5.466E 05 1.744E-02 5.488E-02

CAPERA HOLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHOXCKX) TRAR(TO) BETA(TO)

TOP(T) 7420 80 .0535 2.364E-01 2.551RE-01

SIDE(S) 7425

BOTTOM(B) 7505

PIC NO	TIME	DELTIME	H(101)	M(101)/MREF	H(101)	M(101)/MREF	ST(TO)
S 2944(250)	19.32	19.04	3.264E-03	.1629	4.174E-03	.2340	9.879E-03
T 9234(250)	20.37	19.04	3.174E-03	.1779	4.041E-03	.2276	9.841E-03
S 2945(250)	20.37	19.04	3.174E-03	.1779	4.041E-03	.2276	9.841E-03
M 5151(250)	20.37	19.04	3.174E-03	.1779	4.041E-03	.2276	9.841E-03
M 5152(250)	21.42	20.16	3.048E-03	.1731	3.951E-03	.2215	9.348E-03
T 9235(250)	21.45	20.16	3.048E-03	.1731	3.951E-03	.2215	9.348E-03
S 2946(250)	21.45	20.16	3.048E-03	.1731	3.951E-03	.2215	9.348E-03
T 9236(250)	22.50	21.21	3.011E-03	.1687	3.852E-03	.2158	9.351E-03
M 5153(250)	22.50	21.21	3.011E-03	.1687	3.852E-03	.2158	9.351E-03
S 2947(250)	22.53	21.23	3.009E-03	.1686	3.850E-03	.2156	9.351E-03
T 9237(250)	23.58	22.28	2.937E-03	.1645	3.758E-03	.2105	9.108E-03
S 2948(250)	23.58	22.28	2.937E-03	.1645	3.758E-03	.2105	9.108E-03
M 5154(250)	23.58	22.28	2.937E-03	.1645	3.758E-03	.2105	9.108E-03
M 5155(250)	24.63	23.34	2.870E-03	.1607	3.672E-03	.2056	8.885E-03
T 9238(250)	24.65	23.34	2.869E-03	.1606	3.670E-03	.2055	8.885E-03
S 2949(250)	24.65	23.34	2.869E-03	.1606	3.670E-03	.2055	8.885E-03
T 9239(250)	25.70	24.41	2.804E-03	.1571	3.590E-03	.2010	8.671E-03
M 5156(250)	25.70	24.41	2.804E-03	.1571	3.590E-03	.2010	8.671E-03
S 2950(250)	25.73	24.44	2.805E-03	.1571	3.590E-03	.2010	8.671E-03
T 9240(250)	26.73	25.49	2.747E-03	.1538	3.514E-03	.1967	8.301E-03
S 2951(250)	26.73	25.49	2.747E-03	.1538	3.514E-03	.1967	8.301E-03
M 5157(250)	26.73	25.49	2.747E-03	.1538	3.514E-03	.1967	8.301E-03
M 5158(250)	27.83	26.54	2.642E-03	.1506	3.443E-03	.1926	8.120E-03
T 9241(250)	27.86	26.54	2.640E-03	.1506	3.442E-03	.1927	8.120E-03
S 2952(250)	27.86	26.54	2.640E-03	.1506	3.442E-03	.1927	8.120E-03

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NASA-R1 ORRITER HEATING

AEDC(ARO-INC.) ARNOLD AFS, TENNESSEE  
VON KARMAN GAS DYNAMICS FACILITY  
50 INCH HYPERSONIC TUNNEL R

VA299

GROUP CONFIG MODEL MACH NO PO(P/SIA) TO( DEG R) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREBEND ROLL-MODEL YAW  
45 7 ORRITER R4 7.91 110.8 1259 30.01 -0.01 -30.00 -180.00 -0.00

T-INF P-INF Q-INF V-INF MU-INF MU-INF RE/FT HREF SIREF  
(DEG R) (P/SIA) (FT/SEC) (SLUGS/FT<sup>3</sup>) (LH-SEC/FT<sup>2</sup>) (FT-L) (RZ-0.175EI) (RZ-0.175EI)  
93.2 .012 .535 1742 1.099E-05 7.503E-08 5.481E-05 1.746E-02 5.481E-02

CAMERA ROLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHO/CCK) TBAR(TO) BETA(TO)  
TOP(T) 7420 80  
SIDE(S) 7425  
MOTICW(B) 7505 .0535 2.364E-01 2.5918E-01

PIC NO	TIME DELTIME	H(TOI)	H(TOI)/HREF	M(.910)	M(.910)/HREF	M(.912TO)	M(.912TO)/HREF	ST(TOI)
T 9242(250)	28.91	27.62	2.639E-03	1.177	3.376E-03	1.190	3.262E-03	7.974E-03
M 5159(250)	28.91	27.62	2.639E-03	1.177	3.376E-03	1.190	3.262E-03	7.974E-03
S 2553(250)	28.91	27.62	2.639E-03	1.177	3.376E-03	1.190	3.262E-03	7.974E-03
T 9243(250)	29.58	28.69	2.549E-03	1.148	3.312E-03	1.153	3.200E-03	7.810E-03
M 5160(250)	29.58	28.69	2.549E-03	1.148	3.312E-03	1.153	3.200E-03	7.810E-03
S 2955(250)	31.44	30.14	2.526E-03	1.113	3.231E-03	1.107	3.122E-03	7.619E-03
T 9244(250)	31.44	30.14	2.526E-03	1.113	3.231E-03	1.107	3.122E-03	7.619E-03
M 5161(250)	31.44	30.14	2.526E-03	1.113	3.231E-03	1.107	3.122E-03	7.619E-03
S 2956(250)	33.46	32.17	2.445E-03	1.166	3.127E-03	1.174	3.022E-03	7.356E-03
T 9245(250)	33.46	32.17	2.445E-03	1.166	3.127E-03	1.174	3.022E-03	7.356E-03
M 5162(250)	33.46	32.17	2.445E-03	1.166	3.127E-03	1.174	3.022E-03	7.356E-03
S 2957(250)	35.49	34.20	2.371E-03	1.326	3.033E-03	1.197	2.931E-03	7.153E-03
T 9246(250)	35.49	34.20	2.371E-03	1.326	3.033E-03	1.197	2.931E-03	7.153E-03
M 5163(250)	35.49	34.20	2.371E-03	1.326	3.033E-03	1.197	2.931E-03	7.153E-03
S 2958(250)	37.52	36.23	2.304E-03	1.288	2.947E-03	1.168	2.848E-03	6.944E-03
T 9247(250)	37.52	36.23	2.304E-03	1.288	2.947E-03	1.168	2.848E-03	6.944E-03
M 5164(250)	37.52	36.23	2.304E-03	1.288	2.947E-03	1.168	2.848E-03	6.944E-03
S 2959(250)	39.40	38.24	2.242E-03	1.253	2.867E-03	1.163	2.771E-03	6.755E-03
T 9248(250)	39.40	38.24	2.242E-03	1.253	2.867E-03	1.163	2.771E-03	6.755E-03
M 5165(250)	39.40	38.24	2.242E-03	1.253	2.867E-03	1.163	2.771E-03	6.755E-03
S 2960(250)	39.40	38.24	2.242E-03	1.253	2.867E-03	1.163	2.771E-03	6.755E-03

163

7425  
6746  
CWC

$\alpha = 30^\circ$   
 $\phi = 0^\circ$

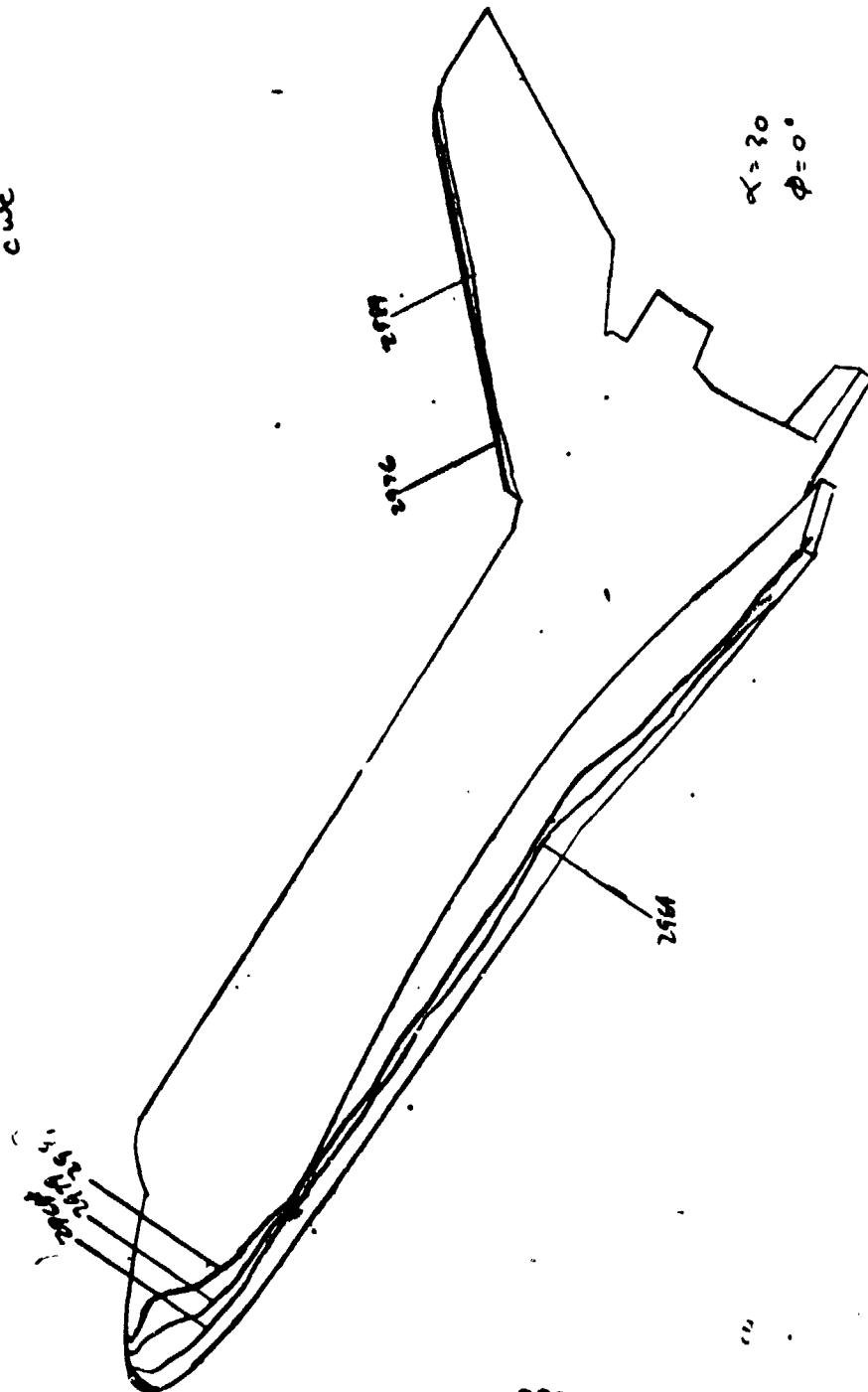


Figure 27



Group 4b  
75C5  
105

E model

4528  
 $\alpha = 30^\circ$   
 $\phi = 0^\circ$

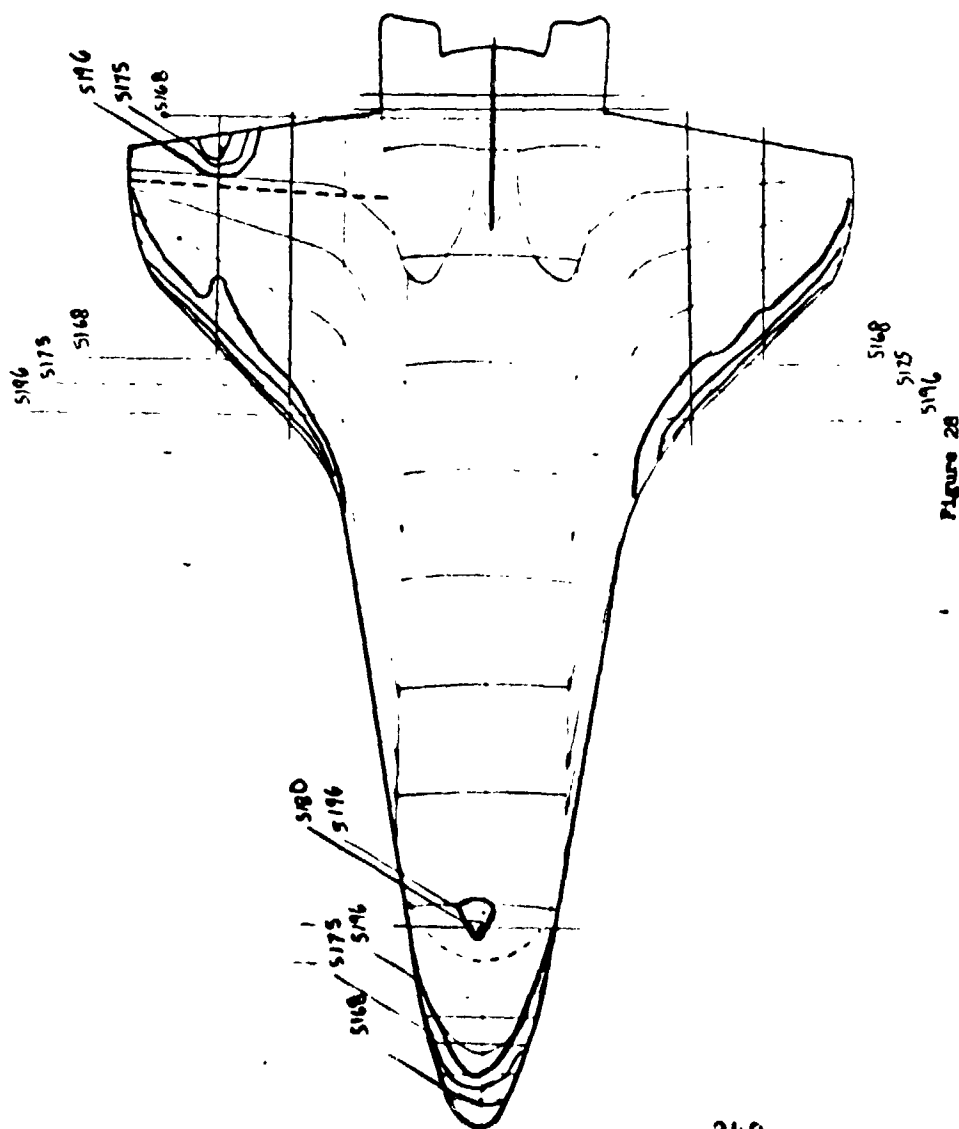


Figure 28

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NASA-RI ORBITER HEATING

AEDC(ARO, INC.) ARNOLD AFB, TENNESSEE  
 VON KARMAN GAS DYNAMIC FACILITY  
 50 INCH. HYPERSONIC TUNNEL W

VA289

GROUP CONFIG MODEL MACH NO POL(PSTA) TO(DEC R) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREBEND ROLL-MODEL YAW  
 4 3 ORBITER E 7.91 109.8 1261 30.01 -0.01 -30.00 -100.00 -0.00

T-INF P-INF Q-INF V-INF RHQ-INF 4U-INF RF/FT MREF STREF  
 (DEG R) (PSTA) (PSTA) (FT/SEC) (SLIMS/FT) (L9-SEC/FT) (FT-1) (R= .0175FI) (R= .0175FI)  
 93.3 .012 .510 3744 1.000E-05 7.511E-08 5.423E 05 1.778E-02 5.509E-02

CAMERA ROLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (MMO/CXK) YBAR(10) BETA(10)  
 TOP(1) 7420 79 0 0  
 SIDE(1) 7425 0.075  
 BOTTOM(1) 7505

PIC NO TIME DELTIME HIT(0) HIT(0)/MREF M(-910) M(-912TO) M(-912TO)/MREF ST(10)

T 9249(113) 1.015 MODEL HAS NOT REACHED CENTERLINE  
 M 5166(113) 1.015 MODEL HAS NOT REACHED CENTERLINE  
 S 2960(113) 4.18 MODEL HAS NOT REACHED CENTERLINE  
 T 9250(113) 2.23 MODEL HAS NOT REACHED CENTERLINE  
 S 2961(113) 2.23 MODEL HAS NOT REACHED CENTERLINE  
 M 5167(113) 2.23 MODEL HAS NOT REACHED CENTERLINE

IMPACT TIME = 2.28

M 5164(113) 3.28 DATA NOT YET VALID  
 T 9251(113) 3.28 DATA NOT YET VALID  
 S 2962(113) 3.28 DATA NOT YET VALID

M 5169(113) 4.26 1.174E-03 .0659 1.434E-03 .0906 1.397E-03 .0785 3.599E-03  
 T 9252(113) 4.26 1.169E-03 .0657 1.430E-03 .0904 1.391E-03 .0782 3.590E-03  
 S 2963(113) 4.26 1.164E-03 .0657 1.430E-03 .0904 1.391E-03 .0782 3.590E-03  
 T 9253(113) 5.43 1.010E-03 .0568 1.236E-03 .0694 1.202E-03 .0676 3.100E-03  
 M 5170(113) 5.43 1.010E-03 .0568 1.236E-03 .0694 1.202E-03 .0676 3.100E-03  
 T 9254(113) 6.51 1.007E-03 .0566 1.232E-03 .0692 1.199E-03 .0673 3.088E-03  
 S 2965(113) 6.51 1.004E-03 .0566 1.232E-03 .0692 1.199E-03 .0673 3.088E-03  
 T 9255(113) 7.56 1.004E-03 .0566 1.232E-03 .0692 1.199E-03 .0673 3.088E-03  
 M 5171(113) 7.56 1.004E-03 .0566 1.232E-03 .0692 1.199E-03 .0673 3.088E-03  
 T 9256(113) 7.56 1.004E-03 .0566 1.232E-03 .0692 1.199E-03 .0673 3.088E-03  
 S 2966(113) 7.56 1.004E-03 .0566 1.232E-03 .0692 1.199E-03 .0673 3.088E-03  
 T 9257(113) 8.63 1.004E-03 .0566 1.232E-03 .0692 1.199E-03 .0673 3.088E-03  
 M 5172(113) 8.63 1.004E-03 .0566 1.232E-03 .0692 1.199E-03 .0673 3.088E-03  
 T 9258(113) 8.63 1.004E-03 .0566 1.232E-03 .0692 1.199E-03 .0673 3.088E-03  
 S 2967(113) 8.63 1.004E-03 .0566 1.232E-03 .0692 1.199E-03 .0673 3.088E-03  
 T 9259(113) 9.69 1.004E-03 .0566 1.232E-03 .0692 1.199E-03 .0673 3.088E-03  
 M 5173(113) 9.69 1.004E-03 .0566 1.232E-03 .0692 1.199E-03 .0673 3.088E-03

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# NASA-R1 ORBITER PEATINE

VA290

AEDC(ARO,INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL R

GROUP CONFID MODEL MACH NO PO(PSTA) TO(DEC R) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREBEND ROLL-MODEL YAW  
 44 7 0REITEM E 7.91 110.3 1261 30.01 -.01 -30.00 -170.00 -.00  
 T-INF P-INF Q-INF V-INF RMO-INF MU-INF RE/FT MREF STREF  
 (DEC R) (PC-A) (PSIA) (ET/SEC) (SLUGS/FT<sup>3</sup>) (LB-SEC/FT<sup>2</sup>) (FT-1) (R<sup>2</sup> .0175FI) (R<sup>2</sup> .0175FI)  
 93.1 .612 .552 17.4 1.093F-05 7.511E-08 5.440E 05 1.702E-02 5.496E-02

CAMERA ROLL NO PAINT IFMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHO/CRK) TRAR(10) BETA(10)  
 TOP(1) 120 79 .0475 4.712E-02 4.3344E-02  
 SIDE(S) 125  
 BOTTOM(B) 125

PTC NO	TIME DELTIME	M(10)	M(10)/MREF	M(.910)	M(.910)/MREF	M(.91210)	M(.91210)/MREF	ST(10)
T 9257(113)	9.71 0.43	7.040E-04	.0398	8.672E-04	.0487	8.438E-04	.0474	2.171E-03
S 294P(113)	9.71 0.43	7.040E-04	.0398	8.672E-04	.0487	8.438E-04	.0474	2.171E-03
T 9258(113)	10.76 9.48	6.895E-04	.0375	8.177E-04	.0459	7.954E-04	.0447	2.040E-03
M 5175(113)	10.76 9.48	6.895E-04	.0375	8.177E-04	.0459	7.954E-04	.0447	2.040E-03
S 2969(113)	10.79 9.51	6.677E-04	.0374	8.166E-04	.0458	7.946E-04	.0446	2.041E-03
T 9259(113)	11.84 10.54	6.246E-04	.0355	7.749E-04	.0435	7.540E-04	.0423	1.939E-03
S 2970(113)	11.84 10.54	6.246E-04	.0355	7.749E-04	.0435	7.540E-04	.0423	1.939E-03
M 5176(113)	11.84 10.54	6.336E-04	.0355	7.749E-04	.0435	7.540E-04	.0423	1.939E-03
T 9260(113)	12.89 11.61	6.042E-04	.0339	7.390E-04	.0415	7.191E-04	.0403	1.849E-03
S 2971(113)	12.89 11.61	6.042E-04	.0339	7.390E-04	.0415	7.191E-04	.0403	1.849E-03
T 9261(113)	13.57 12.69	5.780E-04	.0324	7.070E-04	.0396	6.879E-04	.0386	1.766E-03
S 2972(113)	13.57 12.69	5.780E-04	.0324	7.070E-04	.0396	6.879E-04	.0386	1.766E-03
M 5174(113)	13.57 12.69	5.740E-04	.0324	7.070E-04	.0396	6.879E-04	.0386	1.766E-03
T 9262(113)	15.02 13.74	5.555E-04	.0311	6.794E-04	.0381	6.611E-04	.0371	1.697E-03
S 2973(113)	15.04 13.74	5.555E-04	.0311	6.794E-04	.0381	6.611E-04	.0371	1.697E-03
M 5180(113)	16.09 14.81	5.349E-04	.0300	6.542E-04	.0367	6.366E-04	.0357	1.635E-03
T 9263(113)	16.12 14.84	5.349E-04	.0300	6.542E-04	.0367	6.366E-04	.0357	1.635E-03
S 2974(113)	16.12 14.84	5.349E-04	.0300	6.542E-04	.0367	6.366E-04	.0357	1.635E-03
M 5181(113)	17.17 15.89	5.145E-04	.0290	6.317E-04	.0354	6.147E-04	.0345	1.578E-03
T 9264(113)	17.17 15.89	5.145E-04	.0290	6.317E-04	.0354	6.147E-04	.0345	1.578E-03
S 2975(113)	17.17 15.89	5.145E-04	.0290	6.317E-04	.0354	6.147E-04	.0345	1.578E-03
M 5182(113)	18.22 16.94	5.002E-04	.0290	6.114E-04	.0343	5.953E-04	.0334	1.528E-03
T 9265(113)	18.22 16.94	5.002E-04	.0290	6.114E-04	.0343	5.953E-04	.0334	1.528E-03
S 2976(113)	18.22 16.94	5.002E-04	.0290	6.114E-04	.0343	5.953E-04	.0334	1.528E-03

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MEDICARD, INC., ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 30 INCH HYPERSONIC TUNNEL A

21 9/73

UNIVERSITY OF CALIFORNIA

WASH DC

GROUP	CONFID	MODEL	MACH NO	DOIP(SIA)	TO(DEC R)	ALPHA-MODEL	ALPHA-SECTOR	ALPHA-PREBEND	ROLL-MODEL	YAW
45	3	ORBITER E	7.91	110.5	12.1	34.01	-0.01	-30.90	-100.00	-0.00

T-IAF	P-IAF	O-IAF	V-IAF	RMO-INF	MU-INF	E-F-I	NREF	SREF
(DEG)	(PSIA)	(PSIA)	(FT/SEC)	(SLUG/FTAL)	(LB-SEC/FT <sup>2</sup> )	(FT-1)	(IN)	(IN)
93.3	.012	.33	3743	1.095E-05	7.510E-08	5.546E 05	1.749E-02	5.911E-02

[illegible]

TOP (T)	7420		
TOP (S)	7425	113	79
			.0475
			4.712E-02
			4.3344E-02

PIC NO	TIME	DELTIME	M(TOI)	M(TOI)/MREF	M(.910)	M(.970)/MREF	M(.912TOI)	M(.912TOI)/MREF	ST(10)
S 2976(113)	18.25	18.07	4.998E-04	.6280	6.113E-04	.6343	5.948E-04	.6333	1.524E-03
T 2976(113)	19.30	18.02	4.998E-04	.6272	5.932E-04	.6332	5.772E-04	.6323	1.478E-03
S 2977(113)	19.20	18.82	4.858E-04	.6272	5.932E-04	.6332	5.712E-04	.6323	1.478E-03
M 5103(113)	19.30	19.02	4.858E-04	.6272	5.932E-04	.6332	5.712E-04	.6323	1.478E-03
M 5104(113)	23.25	19.07	4.715E-04	.6264	5.745E-04	.6323	5.611E-04	.6314	1.439E-03
T 0207(113)	20.27	19.09	4.712E-04	.6264	5.745E-04	.6323	5.77E-04	.6314	1.439E-03
S 2978(113)	20.27	19.09	4.712E-04	.6264	5.745E-04	.6323	5.77E-04	.6314	1.439E-03
T 0208(113)	20.27	19.09	4.587E-04	.6257	5.610E-04	.6314	5.459E-04	.6306	1.400E-03
M 5105(113)	21.42	20.15	4.587E-04	.6257	5.610E-04	.6314	5.459E-04	.6306	1.400E-03
S 2979(113)	21.45	20.17	4.584E-04	.6257	5.607E-04	.6314	5.456E-04	.6306	1.398E-03
T 0209(113)	22.40	21.29	4.472E-04	.6250	5.470E-04	.6306	5.322E-04	.6298	1.364E-03
S 2980(113)	22.40	21.29	4.472E-04	.6250	5.470E-04	.6306	5.322E-04	.6298	1.364E-03
M 5106(113)	22.50	21.22	4.488E-04	.6250	5.468E-04	.6306	5.319E-04	.6298	1.364E-03
T 0270(113)	23.55	22.27	4.302E-04	.6244	5.334E-04	.6299	5.192E-04	.6291	1.331E-03
M 5107(113)	23.55	22.27	4.302E-04	.6244	5.334E-04	.6299	5.192E-04	.6291	1.331E-03
S 2981(113)	23.58	22.33	4.300E-04	.6244	5.333E-04	.6299	5.189E-04	.6291	1.331E-03
T 0271(113)	24.63	23.35	4.261E-04	.6239	5.211E-04	.6292	5.071E-04	.6284	1.298E-03
S 2982(113)	24.63	23.35	4.261E-04	.6239	5.211E-04	.6292	5.071E-04	.6284	1.298E-03
M 5108(113)	24.62	23.35	4.261E-04	.6239	5.211E-04	.6292	5.071E-04	.6284	1.298E-03
M 5109(113)	25.62	24.64	4.188E-04	.6233	5.098E-04	.6285	4.960E-04	.6278	1.269E-03
T 0272(113)	25.70	24.43	4.144E-04	.6233	5.044E-04	.6285	4.956E-04	.6278	1.270E-03
S 2983(113)	25.70	24.43	4.144E-04	.6233	5.044E-04	.6285	4.956E-04	.6278	1.270E-03
T 0273(113)	26.76	25.48	4.079E-04	.6228	4.909E-04	.6279	4.854E-04	.6272	1.244E-03
M 5190(113)	26.76	25.48	4.079E-04	.6228	4.909E-04	.6279	4.854E-04	.6272	1.244E-03
S 2984(113)	26.76	25.50	4.077E-04	.6228	4.907E-04	.6279	4.852E-04	.6272	1.242E-03

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• UNCLASSIFIED •

AEDOCIAWO, INC., 1 ARNOLD AFS, TENNESSEE  
 VOM KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL A

941103 - M311060 10-05000

64299

GROUP	COUNT	MODEL	WACH NO	PO(PSIA)	IN(DEG F)	ALPHA-MODEL	ALPHA-SECTION	ALPHA-PREBEND	COLL-MODEL	YAW
46	3	ONE-PIECE E	7.91	110.0	1261	30.01	-.01	-30.00	-180.00	-.00

T-1NF	P-1NF	Q-1F	U-1NF	MO-1NF	MU-1F	RF-1F	MAFF	STREFF
1066 M	(PS-1)	(PT-5FC)	(SL-10S-FT)	(LH-5-C-1)	(F-1E)	(R-0175F)	(R-0175F)	(R-0175F)
996 G	-012	-536	3744	1-099F-05	7-1-12F-08	5-471E 05	1-7A6E-02	5-405F-02

ROLL NO	PAINT TEMP (DEG F)	INITIAL TEMP (DEG F)	SQUARE FOOT (ARMOXACK)	TBAR(TO)	BETA(TO)
CAWBA					
TOP(T)					
1070					
1075	113	79	.0075	4.712E-02	4.3344E-02
1080					
1085					
1090					
1095					
1100					
1105					
1110					
1115					
1120					
1125					
1130					
1135					
1140					
1145					
1150					
1155					
1160					
1165					
1170					
1175					
1180					
1185					
1190					
1195					
1200					
1205					
1210					
1215					
1220					
1225					
1230					
1235					
1240					
1245					
1250					
1255					
1260					
1265					
1270					
1275					
1280					
1285					
1290					
1295					
1300					
1305					
1310					
1315					
1320					
1325					
1330					
1335					
1340					
1345					
1350					
1355					
1360					
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1500					
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[illegible]

Gravel 47  
7420

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8585  
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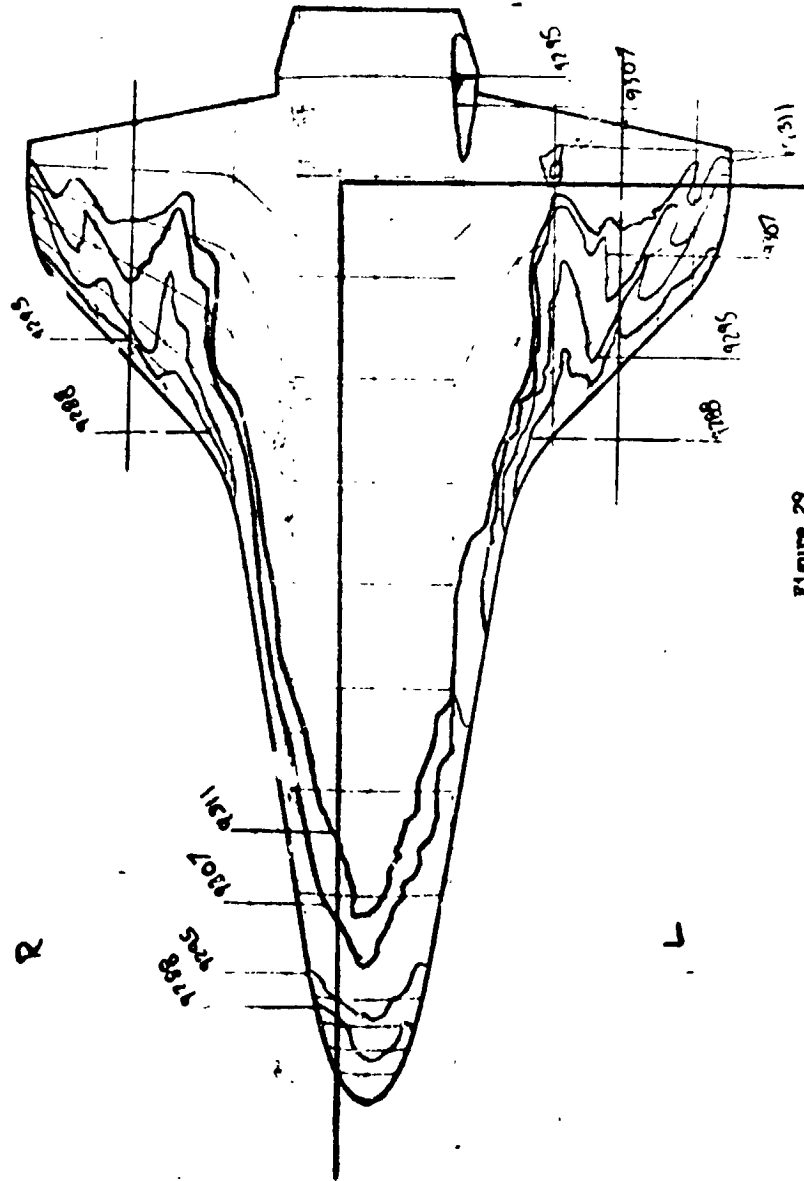


Figure 29

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7/ 9/73

NASA-R1 ORBITER PEATING

VA289

AEDCIARD, INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL R

6-GRUP CONFIG MODEL MACH NO PO(PSIA) TO(DEG R) ALPHA-MODEL ALPHA-SECTION ALPHA-PREBEND ROLL-MODEL YAW  
 47 5 ORBITER H2 7.91 109.8 1262 30.01 .-.01 -30.00 -180.00 -.00  
 T-1AF P-INF Q-INF V-INF MU-INF RHO-INF RE/FT MREF STREF  
 (DEG R) (PSIA) (FT/SEC) (SLUGS/FT<sup>3</sup>) (LH-SEC/FT<sup>2</sup>) (ET-1) (R=.0175FT) (R=.0175FT)  
 93.4 .012 .530 3745 1.047E-05 7.518E-08 5.415E 05 1.778E-02 5.512E-02  
 CAMERA ROLL NO PAIRT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHOXCKK) TRAR(TO) BETA(TO)  
 TOP(T) 7420  
 SIDE(S) 7425  
 BOTTOM(B) 7505

PIC NO TIME DELTIVE H(TO) H(TO)/HREF H(.91TO) H(.91TO)/HREF H(.912TO) H(.912TO)/HREF ST(TO)  
 T 9281(200) 1.15 MODEL HAS NOT REACHED CENTERLINE H(.91TO) H(.91TO)/HREF H(.912TO) H(.912TO)/HREF ST(TO)  
 M 5194(200) 1.15 MODEL HAS NOT REACHED CENTERLINE  
 S 2992(200) 1.15 MODEL HAS NOT REACHED CENTERLINE  
 T 9282(200) 2.23 MODEL HAS NOT REACHED CENTERLINE  
 S 2993(200) 2.23 MODEL HAS NOT REACHED CENTERLINE  
 M 5199(200) 2.23 MODEL HAS NOT REACHED CENTERLINE  
 INJECT TIME = 2.29  
 T 9283(200) 3.30 DATA NOT YET VALID  
 S 2994(200) 3.30 DATA NOT YET VALID  
 M 5200(200) 3.30 DATA NOT YET VALID  
 T 9284(200) 4.36 3.08 5.113E-03 .2869 6.410E-03 .3597 6.213E-03 .3487 1.559E-02  
 M 5201(200) 4.36 3.08 5.113E-03 .2869 6.410E-03 .3597 6.213E-03 .3487 1.559E-02  
 S 2995(200) 4.36 3.11 5.042E-03 .2859 6.394E-03 .3584 6.188E-03 .3475 1.554E-02  
 T 9285(200) 5.43 4.15 4.400E-03 .2470 5.517E-03 .3096 5.348E-03 .3001 1.342E-02  
 S 2996(200) 5.43 4.15 4.400E-03 .2470 5.517E-03 .3096 5.348E-03 .3001 1.342E-02  
 M 5202(200) 5.43 4.15 4.400E-03 .2470 5.517E-03 .3096 5.348E-03 .3001 1.342E-02  
 T 9286(200) 6.48 5.22 3.921E-03 .2204 4.928E-03 .2763 4.777E-03 .2679 1.197E-02  
 M 5203(200) 6.48 5.22 3.921E-03 .2204 4.928E-03 .2763 4.777E-03 .2679 1.197E-02  
 S 2997(200) 6.48 5.22 3.921E-03 .2204 4.928E-03 .2763 4.777E-03 .2679 1.197E-02  
 T 9287(200) 7.56 6.28 3.574E-03 .2008 4.464E-03 .2518 4.347E-03 .2441 1.091E-02  
 M 5204(200) 7.56 6.28 3.574E-03 .2008 4.464E-03 .2518 4.347E-03 .2441 1.091E-02  
 S 2998(200) 7.56 6.31 3.571E-03 .2002 4.477E-03 .2510 4.340E-03 .2434 1.087E-02  
 T 9288(200) 8.63 .34 3.306E-03 .1855 4.145E-03 .2325 4.018E-03 .2254 1.007E-02  
 M 5205(200) 8.63 .34 3.306E-03 .1855 4.145E-03 .2325 4.018E-03 .2254 1.007E-02  
 S 2999(200) 8.63 7.34 3.043E-03 .1733 3.877E-03 .2173 3.758E-03 .2106 9.405E-03  
 T 9289(200) 9.69 8.41 3.043E-03 .1733 3.877E-03 .2173 3.758E-03 .2106 9.405E-03  
 M 5206(200) 9.69 8.41 3.043E-03 .1733 3.877E-03 .2173 3.758E-03 .2106 9.405E-03

201

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7/ 9/73

MECHIAO, INC.) ARNOLD AFS, TENNESSEE  
VON KARMAN GAS DYNAMICS FACILITY  
50 INCH HYPERSONIC TUNNEL R

**MASARI WRITER FEATURING**

WA2A9

GROUP	CONFIG	MODEL	MACH NO	PO(PSIA)	TO(DEG R)	ALPHA-MODEL	ALPHA-SECTION	ALPHA-PREBEND	ROLL-MODEL	YAW
47	5	ORBITER R2	7.91	110.5	1262	30.01	-0.1	-30.00	-180.00	-0.00
T-INF	P-INF	Q-INF	V-INF	RMO-INF	MU-INF	DE/FT	WREF	STREF		
(DEG R)	(PSIA)	(PSIA)	(FT/SEC)	(SLUGS/FT <sup>3</sup> )	(LB-SEC/FT <sup>2</sup> )	(FT-1)	(R= .0175FI)	(R= .0175FI)		
93.4	.012	.533	3745	1.094E-05	7.518E-08	5.244E 0,	1.764E-02	5.495E-02		

WOLL NO	PAINT TEMP (DEG F)	INITIAL TEMP (DEG F)	SQUARE ROOT (RHOCXK)	TRAR(TO)	BETA(TO)
7420					
7425	200	78	.0519	1.696E-01	1.7278E-

	PIC NO	TIME	DELTIME	H(TOT)	M(TOT)/HREF	M(.9TO)	M(.9TO)/HREF	M(.9TO)/HREF	M(.912TO)/HREF	M(.912TO)	ST(TOT)
S	3000(200)	9.71	9.43	3.08E-03	.1732	3.671E-03	.2172	3.753E-03	.2105	3.753E-03	9.408E-03
T	9290(200)	10.76	9.44	2.912E-03	.1633	3.651E-03	.2047	3.539E-03	.1984	3.539E-03	8.863E-03
S	3001(200)	10.16	9.48	2.912E-03	.1633	3.651E-03	.2047	3.539E-03	.1984	3.539E-03	8.863E-03
M	5207(200)	10.76	9.48	2.912E-03	.1633	3.651E-03	.2047	3.539E-03	.1984	3.539E-03	8.863E-03
M	5204(200)	11.81	10.53	2.763E-03	.1549	3.468E-03	.1942	3.357E-03	.1883	3.357E-03	8.410E-03
T	9291(200)	11.84	10.56	2.759E-03	.1547	3.458E-03	.1940	3.353E-03	.1880	3.353E-03	8.400E-03
S	3002(200)	11.84	10.56	2.759E-03	.1547	3.458E-03	.1940	3.353E-03	.1880	3.353E-03	8.400E-03
T	9292(200)	12.89	11.61	2.632E-03	.1476	3.298E-03	.1850	3.198E-03	.1793	3.198E-03	8.010E-03
M	5204(200)	12.89	11.61	2.632E-03	.1476	3.298E-03	.1850	3.198E-03	.1793	3.198E-03	8.010E-03
S	3003(200)	12.91	11.64	2.629E-03	.1473	3.298E-03	.1847	3.195E-03	.1791	3.195E-03	7.998E-03
M	5210(200)	13.54	12.66	2.520E-03	.1412	3.158E-03	.1771	3.062E-03	.1716	3.062E-03	7.664E-03
T	9293(200)	13.57	12.69	2.517E-03	.1411	3.156E-03	.1769	3.059E-03	.1715	3.059E-03	7.656E-03
S	3004(200)	13.57	12.69	2.517E-03	.1411	3.156E-03	.1769	3.059E-03	.1715	3.059E-03	7.656E-03
T	9294(200)	15.02	13.74	2.419E-03	.1355	3.033E-03	.1699	2.940E-03	.1647	2.940E-03	7.351E-03
M	5211(200)	15.02	13.74	2.419E-03	.1355	3.033E-03	.1699	2.940E-03	.1647	2.940E-03	7.351E-03
T	9295(200)	16.07	14.79	2.332E-03	.1306	2.923E-03	.1638	2.834E-03	.1587	2.834E-03	7.085E-03
M	5212(200)	16.07	14.79	2.332E-03	.1306	2.923E-03	.1638	2.834E-03	.1587	2.834E-03	7.085E-03
S	3005(200)	17.09	15.82	2.255E-03	.1263	2.827E-03	.1584	2.740E-03	.1533	2.740E-03	6.840E-03
T	9296(200)	17.12	15.84	2.253E-03	.1262	2.825E-03	.1582	2.738E-03	.1533	2.738E-03	6.840E-03
M	5213(200)	17.12	15.84	2.253E-03	.1262	2.825E-03	.1582	2.738E-03	.1533	2.738E-03	6.840E-03
M	5214(200)	18.15	16.87	2.143E-03	.1223	2.737E-03	.1534	2.651E-03	.1487	2.651E-03	6.634E-03
T	9297(200)	18.17	16.89	2.142E-03	.1222	2.736E-03	.1532	2.651E-03	.1485	2.651E-03	6.629E-03
T	9298(200)	19.20	17.92	2.140E-03	.1187	2.656E-03	.1488	2.574E-03	.1442	2.574E-03	6.437E-03
M	5215(200)	19.20	17.92	2.140E-03	.1187	2.656E-03	.1488	2.574E-03	.1442	2.574E-03	6.437E-03
M	5206(200)	19.25	17.97	2.115E-03	.1185	2.652E-03	.1486	2.571E-03	.1440	2.571E-03	6.428E-03

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7/ 9/73

NASA-R1 ORBITER HEATING

VA2R9

AEDC(ARO,INC.) ARNOLD AFB, TENNESSEE  
VON KARMAN GAS DYNAMICS FACILITY  
50 INCH HYPERSONIC TUNNEL R

GROUP	CONFIG	MODEL	MAC-1 NO	MO(P5IA)	TO(DEG R)	ALPHA-MODEL	ALPHA-SECTOR	ALPHA-PREBEND	ROLL-MODEL	YAW
47	5	ORBITER R2	7.91	110.6	1282	30.01	-0.1	-30.00	-180.00	-0.00
T-1NF	P-1NF	O-1NF	V-1NF	RHO-1NF	MU-1NF	HF/FT	MREF	STREF		
(DEG R)	(PSIA)	(FT/SEC)	(SLUGS/FT3)	(LB-SEC/FT2)	(FT-1)		(R= .0175F1)	(R= .0175F1)		
93.4	.012	.534	3745	1.095E-05	7.518E-08	5.454E 05	1.785E-02	5.492E-02		

CAMFHA	KULL NO	PAINT TEMP (DEG F)	INITIAL TEMP (DEG F)	SQUARE ROOT (RHOXCKX)	TBAR(10)	BETA(10)
TOP(T)	7420					
SIDE(S)	7425					
MOTTC(HR)	7505					

PIC NO	TIME	RELTIME	M(10)	M(10)/HREF	F(1-910)	M(1-910)/HREF	M(1-91210)	M(1-91210)/HREF	ST(10)
M 5216(200)	19.27	17.99	2.114E-03	.1184	2.650E-03	.1485	2.569E-03	.1439	6.423E-03
T 9299(200)	20.25	18.97	2.059E-03	.1153	2.581E-03	.1445	2.502E-03	.1401	6.250E-03
M 5217(200)	20.25	18.97	2.059E-03	.1153	2.581E-03	.1445	2.502E-03	.1401	6.250E-03
M 5214(200)	21.27	20.00	2.005E-03	.1123	2.514E-03	.1408	2.437E-03	.1365	6.088E-03
T 9300(200)	21.20	20.02	2.004E-03	.1122	2.512E-03	.1406	2.435E-03	.1363	6.079E-03
T 9201(200)	22.23	21.05	1.955E-03	.1096	2.450E-03	.1373	2.375E-03	.1331	5.944E-03
M 5219(200)	22.23	21.05	1.955E-03	.1096	2.450E-03	.1373	2.375E-03	.1331	5.944E-03
T 9202(200)	23.28	22.10	1.908E-03	.1068	2.391E-03	.1339	2.318E-03	.1298	5.791E-03
M 5220(200)	23.28	22.10	1.908E-03	.1068	2.391E-03	.1339	2.318E-03	.1298	5.791E-03
T 9203(200)	24.43	23.15	1.864E-03	.1044	2.337E-03	.1308	2.265E-03	.1268	5.658E-03
M 5221(200)	24.43	23.15	1.864E-03	.1044	2.337E-03	.1308	2.265E-03	.1268	5.658E-03
T 9204(200)	25.48	24.29	1.823E-03	.1021	2.285E-03	.1280	2.215E-03	.1240	5.534E-03
M 5222(200)	25.48	24.29	1.823E-03	.1021	2.285E-03	.1280	2.215E-03	.1240	5.534E-03
T 9205(200)	26.51	25.23	1.745E-03	.0999	2.238E-03	.1252	2.170E-03	.1214	5.410E-03
M 5223(200)	26.51	25.23	1.745E-03	.0999	2.238E-03	.1252	2.170E-03	.1214	5.410E-03
T 9206(200)	27.58	26.70	1.715E-03	.0971	2.175E-03	.1217	2.109E-03	.1180	5.259E-03
M 5224(200)	27.58	26.70	1.715E-03	.0971	2.175E-03	.1217	2.109E-03	.1180	5.259E-03
T 9207(200)	29.58	28.71	1.673E-03	.0936	2.098E-03	.1174	2.034E-03	.1138	5.072E-03
M 5225(200)	29.58	28.71	1.673E-03	.0936	2.098E-03	.1174	2.034E-03	.1138	5.072E-03
T 9208(200)	30.01	30.73	1.618E-03	.0905	2.028E-03	.1135	1.966E-03	.1100	4.906E-03
M 5226(200)	32.01	34.73	1.518E-03	.0805	2.028E-03	.1135	1.966E-03	.1100	4.906E-03
T 9209(200)	34.01	37.74	1.567E-03	.0877	1.945E-03	.1099	1.905E-03	.1066	4.749E-03
M 5227(200)	34.01	37.74	1.567E-03	.0877	1.945E-03	.1099	1.905E-03	.1066	4.749E-03
T 9210(200)	36.04	38.76	1.521E-03	.0851	1.907E-03	.1067	1.848E-03	.1034	4.608E-03
M 5228(200)	36.04	38.76	1.521E-03	.0851	1.907E-03	.1067	1.848E-03	.1034	4.608E-03

203

348

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66299

AEDC (ARO, INC.) ARNOLD AFS, TENNESSEE  
VON KARMAN GAS DYNAMICS FACILITY  
50 INCH HYPERSONIC TUNNEL A

7/ 9/73

1.686E-01 1.7278E-01

12T0)/HREF	ST(YO)
1006	4.485E-03
1006	4.485E-03

204

349



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NASA-31 ORBITER PEATING  
 VA289

AEDCI(ARO,INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL R

GROUP CONFIG MODEL MACH NO PO(PSTIA) TO(DEG R) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREHEND ROLL-MODEL YAW  
 4A 2 ORBITER S 7.91 108.6 1262 35.02 -5.02 -30.00 -180.00 -0.00

T-INF P-INF Q-INF V-INF RHO-INF MU-INF RF/FT HREF STREF  
 (DEG R) (PSTIA) (PSIA) (PSIA) (SLUGS/FT<sup>3</sup>) (LB-SEC/FT<sup>2</sup>) (FI-1) (R= .0175EI) (R= .0175EI)  
 93.4 .012 .524 3746 1.075E-05 7.521E-08 5.353E 05 1.749E-02 5.544E-02

CAPRA HOLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHUXCK) TRAR(TO) BETA(TO)  
 TOP(T) 7355  
 SIOF(S) 8302  
 MOT.(M(H)) 7424 .0519 0 0

PIC NO TIME DELTIME H(TO) H(TO)/HREF H(.9TO) H(.923TO) H(.923TO)/HREF ST(TO)

T 9330(200) 1.18 MODEL HAS NOT REACHED CENTERLINE  
 S 3015(200) 1.18 MODEL HAS NOT REACHED CENTERLINE  
 M 5257(200) 1.18 MODEL HAS NOT REACHED CENTERLINE  
 T 9340(200) 2.23 MODEL HAS NOT REACHED CENTERLINE  
 M 5258(200) 2.23 MODEL HAS NOT REACHED CENTERLINE  
 S 3016(200) 2.23 MODEL HAS NOT REACHED CENTERLINE

INJECT TIME = 2.28

DATA NOT YET VALID

DATA NOT YET VALID

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7/ 9/73

NASA-RI ORBITER PEATING

AEDC(ARO) INC. D. ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL R

VA289

GROUP	CONFIG	MODEL	MACH NO	PO(PISA)	TO( DEG R)	ALPHA-MODEL	ALPHA-SECTION	ALPHA-PREBEND	ROLL-MODEL	YAW
49	2	OREITER S	7.91	108.9	1262	35.02	-5.02	-30.00	-180.00	-0.00
T-INF	P-INF	O-INF	V-INF	RHO-INF	MU-INF	PE/FT	MREF	STREF		
(DEG R)	(PSIA)	(PSIA)	(FT/SEC)	(SLUGS/FT <sup>3</sup> )	(LH-SEC/FT <sup>2</sup> )	(FI-1)	(R= .0175FT)	(R= .0175FT)		
91.4	.012	.526	3746	1.078E-05	7.521E-04	5.167E 05	1.771E-02	5.534E-02		
CAMERA	ROLL NO	PAINT IFHP	(DEG F)	INITIAL TEMP	(DEG F)	SQUARE ROOT	(RHOXCR)	TRAR(TO)	BETA(TO)	
TOP(T)	7355			78		.0519		1.683E-01	1.7249E-01	
NOF(S)	8302		200							
MOTTCM(R)	7426									

PIC NO	TIME DELTIME	M(TO)	M(TO)/MREF	M(.9TO)	M(.9TO)/MREF	M(.923TO)	M(.923TO)/MREF	ST(TO)
S 1023(200)	9.66	3.092E-03	.1745	3.976E-03	.2187	3.660E-03	.2065	9.535E-03
T 9248(200)	10.69	2.919E-03	.1647	3.659E-03	.2064	3.455E-03	.1950	8.999E-03
M 5264(200)	10.69	2.919E-03	.1647	3.659E-03	.2064	3.455E-03	.1950	8.999E-03
S 1024(200)	10.71	2.915E-03	.1644	3.653E-03	.2061	3.450E-03	.1946	8.980E-03
T 9249(200)	11.76	2.765E-03	.1559	3.464E-03	.1955	3.273E-03	.1846	8.518E-03
S 1025(200)	11.76	2.765E-03	.1559	3.464E-03	.1955	3.273E-03	.1846	8.518E-03
M 5267(200)	11.76	2.765E-03	.1559	3.464E-03	.1955	3.273E-03	.1846	8.518E-03
T 9250(200)	12.81	2.636E-03	.1486	3.304E-03	.1843	3.120E-03	.1759	8.113E-03
S 1026(200)	12.81	2.636E-03	.1486	3.304E-03	.1843	3.120E-03	.1759	8.113E-03
M 5268(200)	12.81	2.636E-03	.1486	3.304E-03	.1843	3.120E-03	.1759	8.113E-03
S 1027(200)	13.87	2.521E-03	.1422	3.160E-03	.1783	2.984E-03	.1684	7.773E-03
T 9251(200)	13.89	2.521E-03	.1422	3.160E-03	.1783	2.984E-03	.1684	7.773E-03
M 5270(200)	13.89	2.521E-03	.1422	3.160E-03	.1783	2.984E-03	.1684	7.773E-03
T 9252(200)	14.94	2.422E-03	.1365	3.036E-03	.1711	2.867E-03	.1616	7.455E-03
S 1028(200)	14.94	2.422E-03	.1365	3.036E-03	.1711	2.867E-03	.1616	7.455E-03
M 5271(200)	14.94	2.422E-03	.1365	3.036E-03	.1711	2.867E-03	.1616	7.455E-03
T 9253(200)	15.59	2.334E-03	.1316	2.925E-03	.1649	2.763E-03	.1557	7.184E-03
S 1029(200)	15.59	2.334E-03	.1316	2.925E-03	.1649	2.763E-03	.1557	7.184E-03
M 5272(200)	15.59	2.334E-03	.1316	2.925E-03	.1649	2.763E-03	.1557	7.184E-03
T 9254(200)	17.04	2.255E-03	.1270	2.826E-03	.1592	2.669E-03	.1504	6.934E-03
S 1030(200)	17.04	2.255E-03	.1270	2.826E-03	.1592	2.669E-03	.1504	6.934E-03
M 5273(200)	17.04	2.255E-03	.1270	2.826E-03	.1592	2.669E-03	.1504	6.934E-03
T 9255(200)	18.10	2.143E-03	.1230	2.736E-03	.1542	2.584E-03	.1456	6.714E-03
S 1031(200)	18.10	2.143E-03	.1230	2.736E-03	.1542	2.584E-03	.1456	6.714E-03
M 5274(200)	18.10	2.143E-03	.1230	2.736E-03	.1542	2.584E-03	.1456	6.714E-03

209

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NASA-RI ORRITEN PEATING

AEDC(ARO,INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL A

VA289

GROUP CONFTE MODEL MACH NO PO(PSTIA) TO(DEG R) ALPHA-MODEL ALPHA-SECTION ALPHA-PREBEND ROLL-MODEL YAW  
 4A 2 CRELITEN S 7.91 109.3 1263 36.02 -5.02 -30.00 -180.00 -0.00  
 T-1NF P-1NF Q-1NF V-1NF MU-1NF RE/FT MREF STREF  
 (DEG R) (PSTIA) (FT/SEC) (SLUGS/FT<sup>3</sup>) (LB-SEC/FT<sup>3</sup>) (FI-1) (RA .0175EI) (RA .0175EI)  
 93.4 .012 .527 3747 1.091E-05 7.523E-08 5.785E 05 1.775E-02 5.527E-02  
 CAMERA ROLL NO PAINT IFMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHO/CXK) TRAH(TO) BETA(TO)  
 TOP(T) 7255 7P .0519 1.683E-01 1.7249E-01  
 SLOF(S) 8202  
 MOTION(R) 7426

PIC NO TIME DELTIME H(TO) H(TO)/HREF H(TO) H(TO)/HREF H(TO) H(TO)/HREF H(TO) H(TO)/HREF H(TO) H(TO)/HREF  
 T 925A(200) 19.15 17.87 2.118E-03 .1193 2.655E-03 .1405 2.507E-03 .1412 6.507E-03  
 M 527A(200) 19.15 17.87 2.118E-03 .1193 2.655E-03 .1405 2.507E-03 .1412 6.507E-03  
 S 3032(200) 19.17 17.89 2.116E-03 .1193 2.653E-03 .1495 2.505E-03 .1412 6.508E-03  
 M 5275(200) 20.20 18.92 2.048E-03 .1159 2.590E-03 .1453 2.436E-03 .1372 6.324E-03  
 T 935A(200) 20.22 18.94 2.057E-03 .1160 2.578E-03 .1453 2.435E-03 .1373 6.331E-03  
 S 3033(200) 20.22 18.94 2.057E-03 .1160 2.578E-03 .1453 2.435E-03 .1373 6.331E-03  
 T 935A(200) 21.27 20.04 2.002E-03 .1128 2.509E-03 .1414 2.370E-03 .1335 6.156E-03  
 S 3034(200) 21.27 20.04 2.002E-03 .1128 2.509E-03 .1414 2.370E-03 .1335 6.156E-03  
 M 527A(200) 21.27 20.04 2.002E-03 .1128 2.509E-03 .1414 2.370E-03 .1335 6.156E-03  
 T 935A(200) 22.23 21.05 1.941E-03 .1100 2.446E-03 .1378 2.310E-03 .1302 6.001E-03  
 M 5277(200) 22.23 21.05 1.941E-03 .1100 2.446E-03 .1378 2.310E-03 .1302 6.001E-03  
 S 3035(200) 22.25 21.07 1.940E-03 .1098 2.444E-03 .1377 2.309E-03 .1300 5.992E-03  
 T 936A(200) 23.20 22.52 1.846E-03 .1062 2.364E-03 .1332 2.233E-03 .1258 5.795E-03  
 M 527A(200) 23.20 22.52 1.846E-03 .1062 2.364E-03 .1332 2.233E-03 .1258 5.795E-03  
 S 3036(200) 23.23 22.54 1.845E-03 .1062 2.363E-03 .1331 2.232E-03 .1257 5.793E-03  
 T 936A(200) 24.23 24.55 1.817E-03 .1017 2.265E-03 .1275 2.139E-03 .1204 5.546E-03  
 M 527A(200) 24.23 24.55 1.817E-03 .1017 2.265E-03 .1275 2.139E-03 .1204 5.546E-03  
 S 3037(200) 25.25 24.54 1.805E-03 .1017 2.264E-03 .1275 2.138E-03 .1204 5.545E-03  
 T 937A(200) 27.26 26.54 1.746E-03 .0978 2.177E-03 .1226 2.056E-03 .1158 5.335E-03  
 M 528A(200) 27.26 26.54 1.746E-03 .0978 2.177E-03 .1226 2.056E-03 .1158 5.335E-03  
 T 936A(200) 27.28 26.64 1.736E-03 .0977 2.176E-03 .1225 2.055E-03 .1157 5.328E-03  
 S 3038(200) 29.27 28.61 1.674E-03 .0942 2.098E-03 .1181 1.981E-03 .1115 5.134E-03  
 M 528A(200) 29.27 28.61 1.674E-03 .0942 2.098E-03 .1181 1.981E-03 .1115 5.134E-03  
 T 936A(200) 31.29 30.61 1.618E-03 .0911 2.028E-03 .1142 1.916E-03 .1078 4.967E-03

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71 9173

AECC(AHO,INC.) ARNOLD AFB, TENNESSEE  
VON KARMAN GAS DYNAMICS FACILITY  
50 INCH HYPERSONIC TUNNEL A

WAZAQ

GROUP	CONFID	MODEL	MACH NO	P-0(PSIA)	TO(DEG R)	ALPHA-MODEL	ALPHA-SECTOR	ALPHA-PREBEND	ROLL-MODEL	YAW
69	2	ORBITFR 5	7.91	109.5	1263	35.02	-5.02	-30.00	-180.00	-0.00

T-1AF	P-1NF	Q-1NF	V-1NF	RMO-1NF	MU-1NF	RE/F-1	HREF	SREF
ODEG M)	(P51A)	(P51A)	(SLH/SEC)	(SLH/SEC/F13)	(LH-SEC/F12)	(F1-1)	(R2	(M2
93.4	012	52M	3747	1.043F-05	7.523F-04	5.195E 05	1.776E-02	5.522E-02

CAMERA	ROLL NO	PAINT TEMP (DEG F)	INITIAL TEMP (DEG F)	SQUARE ROOT (RHOXCK)	TRANSIT	RETARD
TOP (T)	7355					
SIDE (S)	8202	200	72	.9519	1.683E-01	1.7249E-01

PIC NO	TIME	DELTIME	M1(0)	M1(0)/MREF	M1(910)	M1(070)/MREF	M1(923T0)	M1(923T0)/MREF	ST(10)
Y 3064(200)	31.51	30.63	1.617E-03	.0911	2.027E-03	.1141	1.915E-03	.1078	4.965E-03
Y 3065(200)	31.51	30.63	1.617E-03	.0911	2.027E-03	.1141	1.915E-03	.1078	4.965E-03
M 5243(200)	33.51	32.54	1.564E-03	.0881	1.964E-03	.1105	1.855E-03	.1043	4.802E-03
Y 3065(200)	33.54	32.64	1.564E-03	.0881	1.963E-03	.1105	1.854E-03	.1043	4.804E-03
Y 3061(200)	33.54	32.64	1.564E-03	.0881	1.963E-03	.1105	1.854E-03	.1043	4.804E-03
Y 3065(200)	35.54	34.64	1.521E-03	.0856	1.906E-03	.1073	1.800E-03	.1013	4.663E-03
M 5285(200)	35.54	34.64	1.521E-03	.0856	1.906E-03	.1073	1.800E-03	.1013	4.663E-03
Y 3062(200)	35.57	34.69	1.520E-03	.0855	1.905E-03	.1072	1.799E-03	.1012	4.658E-03
M 5285(200)	37.57	36.69	1.478E-03	.0831	1.853E-03	.1041	1.750E-03	.0984	4.525E-03
Y 3067(200)	37.59	36.72	1.477E-03	.0831	1.852E-03	.1042	1.749E-03	.0984	4.531E-03
S 3063(200)	37.59	36.72	1.477E-03	.0831	1.852E-03	.1042	1.749E-03	.0984	4.531E-03
MODEL HAS LEFT CENTERLINE									
Y 3064(200)	40.00	34.72	1.439E-03	.0809	1.803E-03	.1014	1.703E-03	.0958	4.409E-03
M 5286(200)	40.03	34.72	1.439E-03	.0809	1.803E-03	.1014	1.703E-03	.0958	4.409E-03
Y 3064(200)	43.02	34.74	1.439E-03	.0809	1.803E-03	.1014	1.703E-03	.0957	4.409E-03

Group 1/9  
-1375  
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 $\phi = 0^\circ$

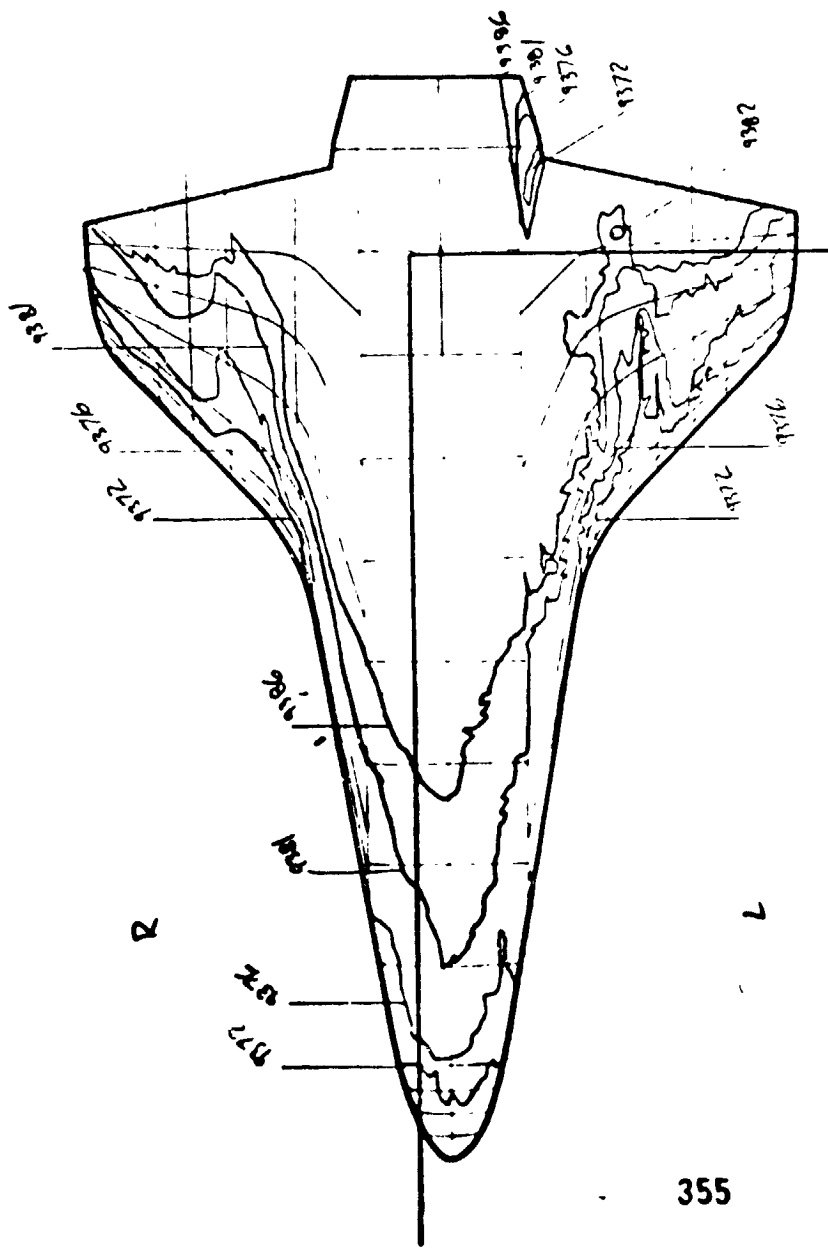


Figure 31



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AEDC(ARO,INC.) ARNOLD AFB, TENNESSEE  
VON KARMAN GAS DYNAMICS FACILITY  
50 INCH HYPERSONIC TUNNEL R

NASA-R1 ORBITER HEATING

VA249

GROUP CONFIG MODEL MACH NO PO(PSTA) TO(UEG R) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREBEND ROLL-MODEL YAW  
40 6 0817000 7.91 189.6 1260 35.02 -5.02 -30.00 -100.00 -0.00

T-INF P-INF Q-INF V-INF MU-INF HE/FT MREF STREF  
(DEG R) (PSTA) (PSIA) (FT/SFC) (SLUGS/FT<sup>3</sup>) (9-SEC/FT<sup>2</sup>) (FT-1) (R= .0175FI) (M= .0175FI)  
93.2 .012 .529 3743 1.007E-05 7.501E-08 5.417E 05 1.776E-02 5.512E-02

CAMFRA ROLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHO1/CXK) TRAF(ITO) BETA(ITO)

TOP(T) 7375  
SIDE(S) 8202  
NOTIC(M) 7426  
200 78 .0519 0 0

PIC NO TIME DELTIME H(TO) H(TO)/MREF H(.910) H(.910)/MREF H(.923TO) H(.923TO)/MREF ST(ITO)

INJECT TIME = 2.30

T 9369(200) 2.20 DATA NOT YET VALID

S 9045(200) 2.20 DATA NOT YET VALID

M 5201(200) 2.20 DATA NOT YET VALID

T 9370(200) 4.23 3.04 5.161E-03 .2901 6.471E-03 .3638 6.110E-03 .3435 1.577E-02

S 9046(200) 4.23 3.04 5.161E-03 .2901 6.471E-03 .3638 6.110E-03 .3435 1.577E-02

M 5202(200) 4.23 3.04 5.161E-03 .2901 6.471E-03 .3638 6.110E-03 .3435 1.577E-02

T 9371(200) 6.23 5.04 3.946E-03 .2244 5.011E-03 .2418 4.731E-03 .2661 1.222E-02

S 9047(200) 6.23 5.04 3.946E-03 .2244 5.011E-03 .2418 4.731E-03 .2661 1.222E-02

M 5203(200) 8.23 7.09 3.377E-03 .1497 4.235E-03 .2178 3.998E-03 .2246 1.030E-02

T 9372(200) 8.23 7.09 3.377E-03 .1497 4.235E-03 .2178 3.998E-03 .2246 1.030E-02

S 9048(200) 8.23 7.09 3.377E-03 .1497 4.235E-03 .2178 3.998E-03 .2246 1.030E-02

M 5204(200) 10.41 9.12 2.974E-03 .1674 3.735E-03 .2098 3.526E-03 .1981 9.093E-03

T 9373(200) 10.41 9.12 2.974E-03 .1674 3.735E-03 .2098 3.526E-03 .1981 9.093E-03

S 9049(200) 10.41 9.12 2.974E-03 .1674 3.735E-03 .2098 3.526E-03 .1981 9.093E-03

M 5205(200) 12.41 11.12 2.647E-03 .1514 3.482E-03 .1898 3.193E-03 .1792 8.219E-03

T 9374(200) 12.41 11.12 2.647E-03 .1514 3.482E-03 .1898 3.193E-03 .1792 8.219E-03

S 9050(200) 12.41 11.12 2.647E-03 .1514 3.482E-03 .1898 3.193E-03 .1792 8.219E-03

M 5206(200) 14.44 13.15 2.400E-03 .1391 3.110E-03 .1744 2.936E-03 .1647 7.545E-03

T 9375(200) 14.44 13.15 2.400E-03 .1391 3.110E-03 .1744 2.936E-03 .1647 7.545E-03

S 9051(200) 14.44 13.15 2.400E-03 .1391 3.110E-03 .1744 2.936E-03 .1647 7.545E-03

M 5207(200) 16.47 15.18 2.349E-03 .1295 2.895E-03 .1624 2.733E-03 .1533 7.023E-03

T 9376(200) 16.47 15.18 2.349E-03 .1295 2.895E-03 .1624 2.733E-03 .1533 7.023E-03

S 9052(200) 16.47 15.18 2.349E-03 .1295 2.895E-03 .1624 2.733E-03 .1533 7.023E-03

M 5208(200) 18.50 17.20 2.104E-03 .1216 2.719E-03 .1525 2.567E-03 .1440 6.596E-03

T 9377(200) 18.50 17.20 2.104E-03 .1216 2.719E-03 .1525 2.567E-03 .1440 6.596E-03

S 9053(200) 18.50 17.20 2.104E-03 .1216 2.719E-03 .1525 2.567E-03 .1440 6.596E-03

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NASA-BI ORBITER HEATING

AEDC(ARO, INC.) ARNOLD AFS, TENNESSEE

VON KARMAN GAS DYNAMICS FACILITY

50 INCH HYPERSONIC TUNNEL #

WATER

GROUP COMP 16 MODEL MACH NO PO (PSIA) TO (DEG R) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREBEND ROLL-MODEL YAW

49 4 ORBITER R3 7.91 110.4 1260 35.02 -5.02 -30.00 -180.00 -0.00

T-1NF P-1NF Q-1NF V-1NF MU-1NF MU-1NF PF/FT MREF STREF

(DEG R) (PSIA) (FT/SEC) (SLUGS/FT<sup>3</sup>) (LBS-SEC/FT<sup>3</sup>) (LBS-SEC/FT<sup>3</sup>) (LBS-SEC/FT<sup>3</sup>) (LBS-SEC/FT<sup>3</sup>)

93.2 -0.12 .533 3763 1.094E-04 7.507E-04 5.451E 05 1.743E-02 5.492E-02

CAPCHA ROLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHO/CAR) TRANSITIO BETAITO

TOPITI 7275 200 78 .0519 1.690E-01 1.7329E-01

WOTTONIR 7426

QIC NO	TIME DELTIME	HIT0	HIT0/HREF	M(-GT0)	M(-GT0)/HREF	M(-GT0)	M(-GT0)/HREF	ST(ITO)
T 9174(200)	20.52	19.23	2.051E-03	.1150	2.512E-03	.1442	2.428E-03	.1362
M 5294(200)	20.52	19.23	2.051E-03	.1150	2.512E-03	.1442	2.428E-03	.1362
S 3054(200)	20.55	19.24	2.020E-03	.1150	2.510E-03	.1441	2.427E-03	.1361
M 5291(200)	22.55	21.24	1.951E-03	.1193	2.444E-03	.1371	2.304E-03	.1294
T 9179(200)	22.58	21.24	1.950E-03	.1193	2.445E-03	.1371	2.308E-03	.1295
S 3055(200)	22.58	21.24	1.940E-03	.1193	2.445E-03	.1371	2.304E-03	.1295
T 9180(200)	24.50	23.31	1.843E-03	.1044	2.314E-03	.1309	2.205E-03	.1236
S 3056(200)	24.50	23.31	1.843E-03	.1044	2.314E-03	.1309	2.205E-03	.1236
M 5298(200)	24.50	23.31	1.843E-03	.1044	2.314E-03	.1309	2.205E-03	.1236
T 9181(200)	26.53	25.34	1.747E-03	.1001	2.240E-03	.1245	2.115E-03	.1185
S 3057(200)	26.53	25.34	1.747E-03	.1001	2.240E-03	.1245	2.115E-03	.1185
M 5294(200)	26.53	25.34	1.747E-03	.1001	2.240E-03	.1245	2.115E-03	.1185
T 9182(200)	28.56	27.37	1.719E-03	.0963	2.156E-03	.1208	2.035E-03	.1140
S 3060(200)	28.56	27.37	1.719E-03	.0963	2.156E-03	.1208	2.035E-03	.1140
M 5301(200)	28.56	27.37	1.719E-03	.0963	2.156E-03	.1208	2.035E-03	.1140
T 9183(200)	30.59	29.39	1.659E-03	.0929	2.070E-03	.1165	1.904E-03	.1100
S 3058(200)	30.59	29.39	1.659E-03	.0929	2.070E-03	.1165	1.904E-03	.1100
M 5294(200)	30.59	29.39	1.659E-03	.0929	2.070E-03	.1165	1.904E-03	.1100
T 9184(200)	32.74	31.44	1.604E-03	.0894	2.011E-03	.1126	1.899E-03	.1063
S 3061(200)	32.74	31.44	1.604E-03	.0894	2.011E-03	.1126	1.899E-03	.1063
M 5302(200)	32.74	31.44	1.604E-03	.0894	2.011E-03	.1126	1.899E-03	.1063
T 9185(200)	34.76	33.47	1.555E-03	.0871	1.944E-03	.1092	1.840E-03	.1031
S 3062(200)	34.76	33.47	1.555E-03	.0871	1.944E-03	.1092	1.840E-03	.1031
M 5303(200)	34.76	33.47	1.555E-03	.0871	1.944E-03	.1092	1.840E-03	.1031
T 9186(200)	36.79	35.54	1.510E-03	.0845	1.893E-03	.1060	1.787E-03	.1001
S 3064(200)	36.79	35.54	1.510E-03	.0845	1.893E-03	.1060	1.787E-03	.1001
M 5304(200)	36.79	35.54	1.510E-03	.0845	1.893E-03	.1060	1.787E-03	.1001

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NASA-RI ORBITER HEATING

AEDC(ARO-INC.) ARNOLD AFB, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL W

VA200

GROUP COMP16 MODEL MACH NO PO(PST) TO(IDEG R) ALPHA-MODEL ALPHA-SECTOR ALPHA-PPEBEND ROLL-MODEL YAW  
 49 4 GREITER 63 7.91 110.8 1260 35.02 -5.02 -30.00 -100.00 -0.00  
 T-INF 0-INF V-INF RMQ-INF MU-INF HF/FT HREF STREF  
 (DEG R) (PSIA) (FI/SEC) (SLUGS/FI3) (LB-SEC/FI2) (FI-1) (R4-0175EI) (H=0175EI)  
 93.3 .012 .535 3743 1.402E-05 7.508E-08 5.478E 05 1.746E-02 5.483E-02  
 CAMERA MOLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RMORCAK) TRANSITO BETA(170)  
 TOP(Y) 7275  
 SIDE(S) 8202  
 MOLL(M19) 7426 .0519 1.690E-01 1.7329E-01

PIC NO TIME DELTIME M(TO) M(TO)/MREF M(L9TO) M(L9TO)/MREF M(L923TO) M(L923TO)/MREF ST(170)  
 4 3082(200) 30.82 39.52 MODEL WAS LEFT CENTERLINE .0645 1.892E-01 .1060 1.787E-03 .1001 4.578E-03  
 37.87  
 M 5705(200) 38.82 37.53 1.448E-03 .0222 1.841E-03 1.738E-03 .0973 4.447E-03  
 1 9701(200) 38.84 37.54 1.448E-03 .0222 1.840E-03 1.738E-03 .0973 4.453E-03  
 5 1161(200) 38.84 37.54 1.448E-03 .0222 1.840E-03 1.738E-03 .0973 4.453E-03  
 1 9384(200) 40.87 39.58 1.430E-03 .0200 1.793E-03 1.693E-03 .0947 4.330E-03  
 5 3084(200) 40.87 39.58 1.430E-03 .0200 1.793E-03 1.693E-03 .0947 4.330E-03  
 M 5704(200) 40.87 39.58 1.430E-03 .0200 1.793E-03 1.693E-03 .0947 4.330E-03



REPRODUCIBILITY OF THE ORIGINAL PAGE IS POOR.

Group 50  
7375  
ms

8598  
 $\alpha = 35^\circ$   
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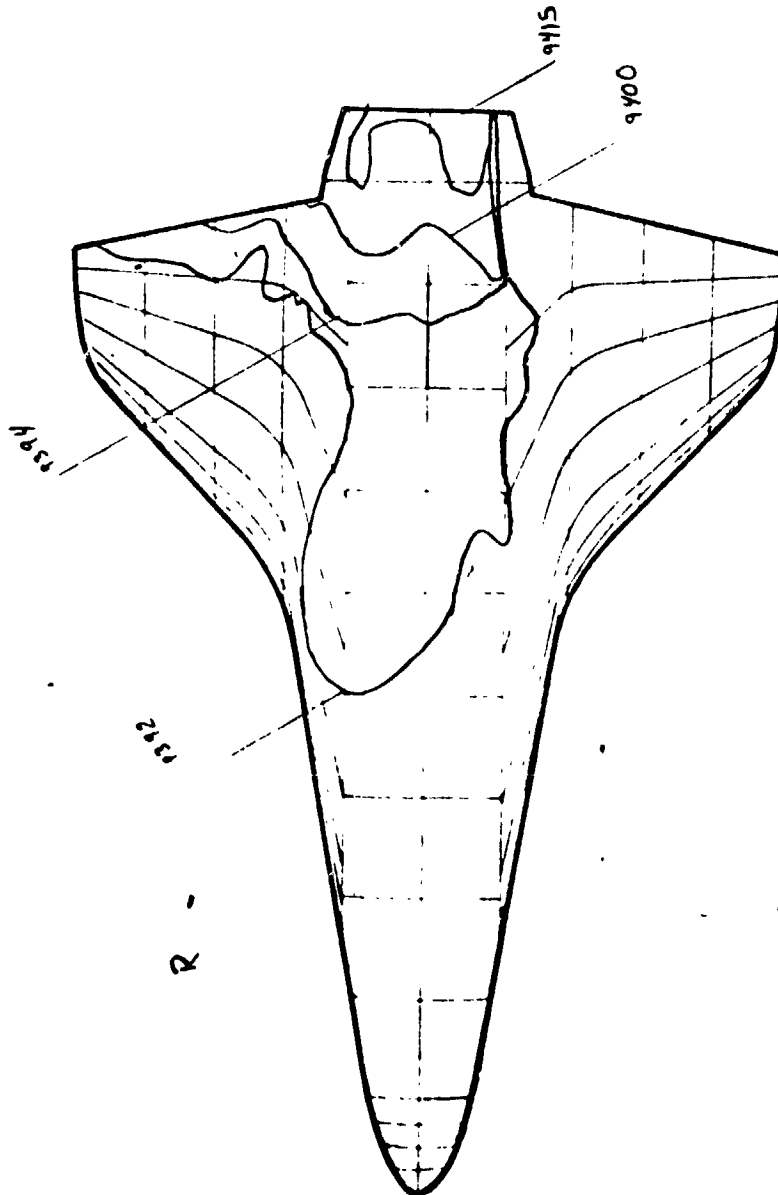


Figure 33

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NASA-RI ORBITER HEATING

V2249

AEDC(ARO,INC.) ARNOLD AFS, TENNESSEE  
VON KARMAN GAS DYNAMICS FACILITY  
50 INCH HYPERSONIC TUNNEL B

GROUP CONF16 MODEL MACH NO PR(PISA) TO(LEG R) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREBEND ROLL-MODEL YAW  
50 2 ORBITER S 7.91 110.0 1261 35.00 -5.00 -30.00 -100.00 -0.00  
T-INF P-TMF Q-INF V-INF RMO-INF MU-INF RE/FT MREF STREF  
IDEG R) (PISA) (PISA) (FT/SEC) (SLUGS/FT3) (LBS-SEC/FT2) (FT-1) (R= .0175FT) (R= .0175FT)  
93.3 .012 .531 37.1 1.090E-07 7.510E-08 5.434E 05 1.780E-02 5.504E-02  
CAMERA ROLL NO PAINT IFMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHOXCRK) TRAR(ITO) BETA(ITO)  
TOP(IT) 7375  
SIDE(1S) 8302 113 70 .0475 0 0  
MOTTCR(1R) 7426

PIC NO	TIME DELTME	H(ITO)	H(ITO)/HREF	H(-9TO)	H(-9TO)/HREF	H(-923TO)	H(-923TO)/HREF	ST(ITO)
T 9389(113)	1.10	MODEL HAS NOT REACHED CENTERLINE						
S 3065(113)	1.10	MODEL HAS NOT REACHED CENTERLINE						
M 5307(113)	1.18	MODEL HAS NOT REACHED CENTERLINE						
M 5308(113)	2.23	MODEL HAS NOT REACHED CENTERLINE						
T 9390(113)	2.25	MODEL HAS NOT REACHED CENTERLINE						
S 3066(113)	2.25	MODEL HAS NOT REACHED CENTERLINE						
INJECT TIME = 2.30								
M 5309(113)	3.20	DATA NOT YET VALID						
T 9391(113)	3.20	DATA NOT YET VALID						
S 3067(113)	3.30	DATA NOT YET VALID						
S 3068(113)	4.26	1.212E-03	.0480	1.481E-03	.0831	1.408E-03	.0790	3.706E-03
M 5310(113)	4.26	1.212E-03	.0680	1.481E-03	.0831	1.408E-03	.0790	3.706E-03
T 9392(113)	4.30	1.207E-03	.0677	1.475E-03	.0826	1.402E-03	.0786	3.684E-03
T 9393(113)	4.11	1.046E-03	.0586	1.273E-03	.0716	1.215E-03	.0681	3.195E-03
M 5311(113)	5.41	1.046E-03	.0586	1.273E-03	.0716	1.215E-03	.0681	3.195E-03
S 3069(113)	5.43	1.043E-03	.0584	1.274E-03	.0714	1.211E-03	.0679	3.182E-03
T 9394(113)	6.40	9.312E-04	.0522	1.138E-03	.0637	1.082E-03	.0606	2.842E-03
S 3070(113)	6.40	9.312E-04	.0522	1.138E-03	.0637	1.082E-03	.0606	2.842E-03
M 5312(113)	6.40	9.312E-04	.0522	1.138E-03	.0637	1.082E-03	.0606	2.842E-03
T 9395(113)	7.53	8.492E-04	.0474	1.037E-03	.0591	9.863E-04	.0553	2.591E-03
S 3071(113)	7.53	8.492E-04	.0474	1.037E-03	.0591	9.863E-04	.0553	2.591E-03
M 5313(113)	7.53	8.492E-04	.0474	1.037E-03	.0591	9.863E-04	.0553	2.591E-03
T 9396(113)	8.58	7.856E-04	.0440	9.597E-04	.0538	9.124E-04	.0511	2.395E-03
S 3072(113)	8.58	7.856E-04	.0440	9.597E-04	.0538	9.124E-04	.0511	2.395E-03
M 5314(113)	8.58	7.856E-04	.0440	9.597E-04	.0538	9.124E-04	.0511	2.395E-03
T 9397(113)	9.64	7.344E-04	.0411	8.972E-04	.0503	8.530E-04	.0478	2.239E-03
M 5315(113)	9.64	7.344E-04	.0411	8.972E-04	.0503	8.530E-04	.0478	2.239E-03

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NASA-R1 ORBITER PEATING

AEDC(ARO,INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL R

VA2M9

GROUP COMPTE MODEL MACH NO OR(PSTA) IN(DEG R) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREBEND ROLL-MODEL YAW  
 50 2 ORBITER S 7.91 110.7 1261 35.00 -5.00 -30.00 -180.00 -0.00

T-INF P-INF Q-INF V-INF RMO-INF MU-INF RE/FT MREF STREF  
 (DEG R) (PSTA) (PSTA) (FT/SEC) (SLUGS/FT3) (LB-SEC/FT2) (FT-1) (R= .0175FI) (R= .0175FI)  
 93.3 .012 .534 3743 1.097E-05 7.510E-08 5.469E 05 1.745E-02 5.486E-02

CAMERA HOLL NO PAINT TEMP IDEG F INITIAL TEMP (DEG F) SQUARE ROOT (RHOXCK) TRAR(TO) BETA(TO)  
 TOP(T) 7375 78 .0475 4.845E-02 4.466E-02  
 SIDF(S) 8302 113  
 MOTTCM(R) 7426

PTC NO	TIME DELTIME	M(TO)	M(TO)/MREF	M(.910)	M(.910)/MREF	M(.923TO)	M(.923TO)/MREF	ST(TO)
S 3073(113)	9.66 9.37	7.333E-04	.0311	6.959E-04	.0302	8.517E-04	.0477	2.236E-03
M 5316(113)	10.69 9.39	6.921E-04	.0307	6.455E-04	.0303	8.038E-04	.0450	2.108E-03
T 0298(113)	10.71 9.42	6.912E-04	.0307	6.444E-04	.0303	8.029E-04	.0449	2.108E-03
S 3076(113)	10.71 9.42	6.912E-04	.0307	6.444E-04	.0303	8.029E-04	.0449	2.108E-03
T 9399(113)	11.76 10.47	6.556E-04	.0307	6.099E-04	.0303	7.614E-04	.0426	1.997E-03
S 3075(113)	11.76 10.47	6.556E-04	.0307	6.099E-04	.0303	7.614E-04	.0426	1.997E-03
M 5317(113)	11.76 10.47	6.556E-04	.0307	6.099E-04	.0303	7.614E-04	.0426	1.997E-03
T 9400(113)	12.81 11.52	6.250E-04	.0300	5.735E-04	.0297	7.259E-04	.0406	1.902E-03
S 3074(113)	12.81 11.52	6.250E-04	.0300	5.735E-04	.0297	7.259E-04	.0406	1.902E-03
M 5318(113)	12.81 11.52	6.250E-04	.0300	5.735E-04	.0297	7.259E-04	.0406	1.902E-03
T 9401(113)	13.87 12.57	5.943E-04	.0295	5.309E-04	.0290	6.948E-04	.0389	1.821E-03
S 3077(113)	13.87 12.57	5.943E-04	.0295	5.309E-04	.0290	6.948E-04	.0389	1.821E-03
M 5320(113)	13.87 12.57	5.943E-04	.0295	5.309E-04	.0290	6.948E-04	.0389	1.821E-03
T 9402(113)	14.92 13.62	5.747E-04	.0291	5.145E-04	.0286	6.675E-04	.0373	1.749E-03
S 3078(113)	14.92 13.62	5.747E-04	.0291	5.145E-04	.0286	6.675E-04	.0373	1.749E-03
M 5321(113)	14.92 13.62	5.747E-04	.0291	5.145E-04	.0286	6.675E-04	.0373	1.749E-03
T 9403(113)	15.99 14.70	5.533E-04	.0287	4.915E-04	.0282	6.426E-04	.0360	1.684E-03
S 3079(113)	15.99 14.70	5.533E-04	.0287	4.915E-04	.0282	6.426E-04	.0360	1.684E-03
M 5322(113)	15.99 14.70	5.533E-04	.0287	4.915E-04	.0282	6.426E-04	.0360	1.684E-03
T 9404(113)	17.04 15.75	5.345E-04	.0280	4.730E-04	.0275	6.209E-04	.0347	1.625E-03
S 3080(113)	17.04 15.75	5.345E-04	.0280	4.730E-04	.0275	6.209E-04	.0347	1.625E-03
M 5323(113)	17.04 15.75	5.345E-04	.0280	4.730E-04	.0275	6.209E-04	.0347	1.625E-03
T 9405(113)	18.10 16.84	5.175E-04	.0274	4.575E-04	.0269	6.011E-04	.0336	1.574E-03
S 3081(113)	18.10 16.84	5.175E-04	.0274	4.575E-04	.0269	6.011E-04	.0336	1.574E-03
M 5324(113)	18.10 16.84	5.175E-04	.0274	4.575E-04	.0269	6.011E-04	.0336	1.574E-03
T 9406(113)	19.12 17.87	5.011E-04	.0269	4.415E-04	.0264	5.806E-04	.0336	1.572E-03

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NASA-RI ORBITER PEATING  
 AEDC(ARO-INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL #

GROUP COMP16 MODEL  
 50 2 ORBITER S

GROUP COMP16 MODEL MACH NO PR(PISA) TO(DEC R) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREBEND ROLL-MODEL YAW  
 50 2 ORBITER S 7.91 111.0 1261 34.00 -5.00 -30.00 -180.00 -0.00

T-INF P-INF Q-INF V-INF MU-INF RHO-INF MU-INF RE/FT HREF STREF  
 (DEG R) (PSIA) (PSIA) (FT/SEC) (LBS/SEC/FT) (LBS/SEC/FT) (FT-L) (R= .0175E1) (R= .0175E1)

93.3 .012 .536 3744 1.100E-05 7.511E-08 5.482E 05 1.774E-02 5.479E-02

CAMFRA ROLL NO PAINT IFMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (MMO/CAL) TRAR(TO) BETA(TO)  
 TOP(T) 7375 113 70 .0475 4.845E-02 4.4661E-02  
 SIDE(S) 6302  
 NOIC(HR) 7426

PIC NO	TIME DELTIME	M(TO)	M(TO)/HREF	M(.970)	M(.970)/HREF	M(.923TO)	M(.923TO)/HREF	ST(1.0)
M 5324(113)	19.15	5.020E-04	.0281	6.133E-04	.0343	5.831E-04	.0326	1.525E-03
T 9406(113)	19.17	5.017E-04	.0281	6.129E-04	.0343	5.827E-04	.0326	1.526E-03
S 3082(113)	19.17	5.017E-04	.0281	6.129E-04	.0343	5.827E-04	.0326	1.526E-03
T 9407(113)	20.22	4.876E-04	.0273	5.958E-04	.0333	5.663E-04	.0317	1.482E-03
S 3983(113)	20.22	4.876E-04	.0273	5.958E-04	.0333	5.663E-04	.0317	1.482E-03
M 5325(113)	20.22	4.876E-04	.0273	5.958E-04	.0333	5.663E-04	.0317	1.482E-03
T 9408(113)	21.27	4.746E-04	.0265	5.798E-04	.0324	5.512E-04	.0308	1.442E-03
M 5326(113)	21.27	4.746E-04	.0265	5.798E-04	.0324	5.512E-04	.0308	1.442E-03
S 3084(113)	21.30	4.746E-04	.0265	5.798E-04	.0324	5.512E-04	.0308	1.442E-03
T 9409(113)	22.55	4.611E-04	.0257	5.621E-04	.0314	5.344E-04	.0299	1.397E-03
S 3085(113)	22.55	4.611E-04	.0257	5.621E-04	.0314	5.344E-04	.0299	1.397E-03
M 5327(113)	22.55	4.611E-04	.0257	5.621E-04	.0314	5.344E-04	.0299	1.397E-03
T 9410(113)	24.58	4.346E-04	.0246	5.371E-04	.0300	5.106E-04	.0285	1.336E-03
M 5328(113)	24.58	4.346E-04	.0246	5.371E-04	.0300	5.106E-04	.0285	1.336E-03
S 3086(113)	24.60	4.346E-04	.0246	5.371E-04	.0300	5.106E-04	.0285	1.336E-03
T 9411(113)	26.61	4.216E-04	.0236	5.151E-04	.0288	4.897E-04	.0274	1.279E-03
S 3087(113)	26.61	4.216E-04	.0236	5.151E-04	.0288	4.897E-04	.0274	1.279E-03
M 5329(113)	26.61	4.216E-04	.0236	5.151E-04	.0288	4.897E-04	.0274	1.279E-03
T 9412(113)	28.61	4.054E-04	.0227	4.959E-04	.0277	4.714E-04	.0263	1.231E-03
M 5330(113)	28.61	4.054E-04	.0227	4.959E-04	.0277	4.714E-04	.0263	1.231E-03
S 3088(113)	28.63	4.054E-04	.0227	4.959E-04	.0277	4.714E-04	.0263	1.231E-03
T 9413(113)	30.64	3.916E-04	.0219	4.786E-04	.0267	4.549E-04	.0254	1.187E-03
S 3089(113)	30.64	3.916E-04	.0219	4.786E-04	.0267	4.549E-04	.0254	1.187E-03
M 5331(113)	30.64	3.916E-04	.0219	4.786E-04	.0267	4.549E-04	.0254	1.187E-03
S 3090(113)	32.64	3.749E-04	.0211	4.629E-04	.0258	4.401E-04	.0246	1.147E-03

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AEDC(AHO,INC.) ARNOLD AFS, TENNESSEE  
VON KARMAN GAS DYNAMICS FACILITY  
50 INCH HYPERSONIC TUNNEL A

**NASA-RI ORALIER HEATING**

6A289

GROUP	CONFID	MODEL	MACH NO	PROPSIA	TO(DEG R)	ALPHA-MODEL	ALPHA-SECTION	ALPHA-PREBEND	ROLL-MODEL	YAW
50	2	ORBITER S	7.91	111.4	1261	35.00	-5.00	-30.00	-180.00	-0.00
93.3	.012	P-INF (PSIA)	V-INF (FT/SEC)	RMS-INF (SLUGS/FT <sup>3</sup> )	MU-INF	RE/FT	WREF	STREF		
		P-INF (PSIA)	V-INF (FT/SEC)	(SLUGS/FT <sup>3</sup> )	(LB-SECTION)	(F-1)	(R= .0175F1)			
		.012	.538	3744	1.105E-05	7.512E-08	5.805E 05	1.792E-02	5.468E-02	

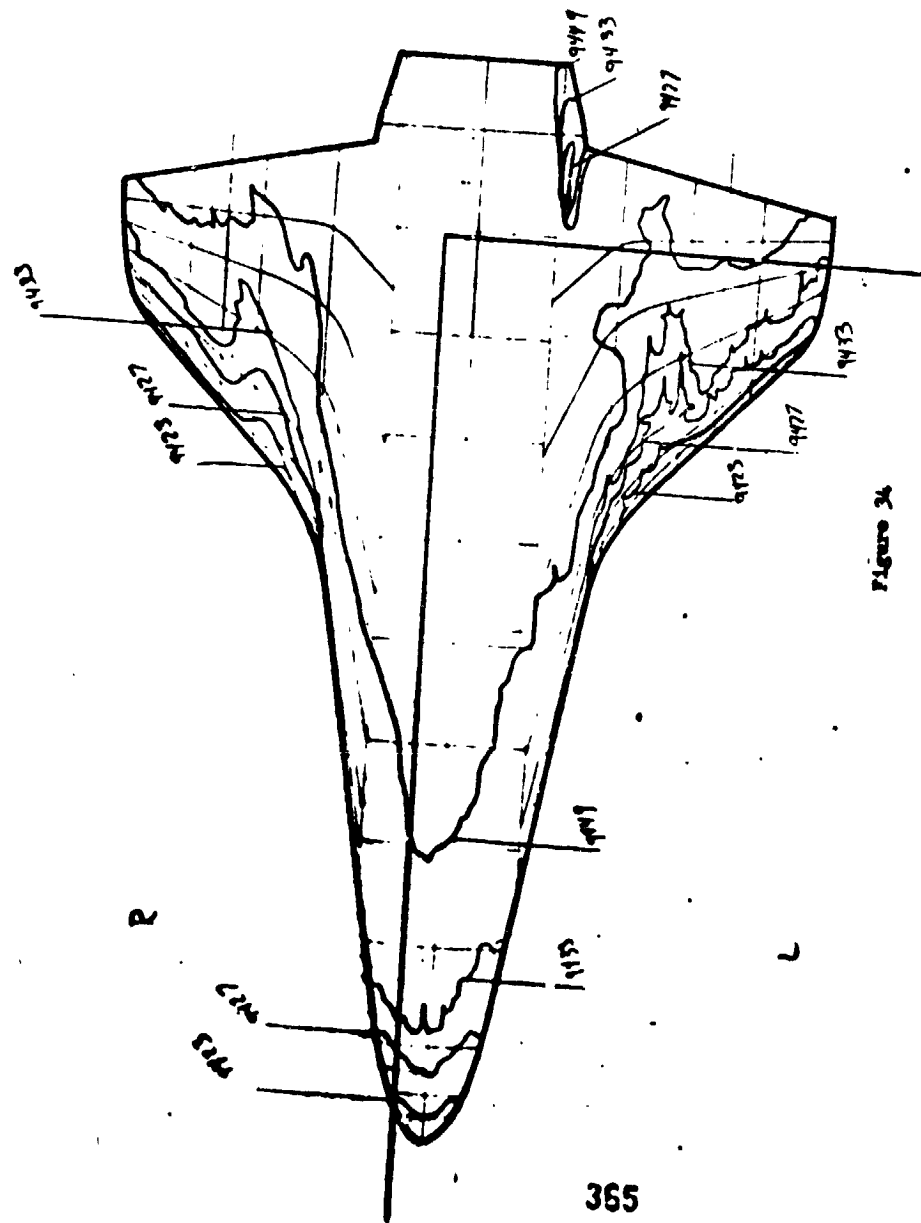
CAMERA	ROLL NO	PAINT	IFMP (DEG F)	INITIAL TEMP (DEG F)	SQUARE ROOT (RH0XCXK)	TRAR(TO)	BETA(TO)

NAME	TIME(S)	70	.0475	4.045E-02	4.4661E-02
SIDE(S)	8302	113			
WATLOW/8	7426				

	PIC NO	TIME	DELTIME	M(TO)	M(TO)/MREF	M(-9TO)	M(-9TO)/MREF	M(-923TO)	M(-923TO)/MREF	ST(TO)
T	9414(113)	32.66	31.37	3.748E-04	.0211	4.637E-04	.0258	4.399E-04	.0246	1.148E-03
M	5332(113)	32.66	31.37	3.748E-04	.0211	4.637E-04	.0258	4.399E-04	.0246	1.148E-03
F	9415(113)	32.66	33.37	3.672E-04	.0205	4.486E-04	.0250	4.265E-04	.0238	1.113E-03
M	5333(113)	34.66	33.37	3.672E-04	.0205	4.486E-04	.0250	4.265E-04	.0238	1.13E-03
S	3091(113)	34.69	33.40	3.671E-04	.0205	4.484E-04	.0250	4.263E-04	.0238	1.111E-03
T	9416(113)	36.69	35.40	3.565E-04	.0199	4.356E-04	.0243	4.141E-04	.0231	1.078E-03
M	5234(113)	36.69	35.40	3.565E-04	.0199	4.356E-04	.0243	4.141E-04	.0231	1.078E-03
S	3092(113)	36.72	35.42	3.564E-04	.0199	4.354E-04	.0243	4.140E-04	.0231	1.080E-03
MODEL HAS LEFT CENTERLINE										
T	9417(113)	38.72	37.43	3.468E-04	.0194	4.236E-04	.0236	4.027E-04	.0225	1.050E-03
M	5135(113)	38.72	37.43	3.468E-04	.0194	4.236E-04	.0236	4.027E-04	.0225	1.050E-03
S	3033(113)	38.74	37.45	3.466E-04	.0193	4.235E-04	.0236	4.026E-04	.0225	1.049E-03

NO  
7375  
Group 15 drawing

8598  
C = 35  
D = 0





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7/ 9/73

W450-R1 ORBITER PEATING

AEDCIARO, INC.) ARNOLD AFS, TENNESSEE  
 VOM KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL #

VA289

GROUP CNMF16 MODEL MACH NO PG(PSIA) TO(EG R) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREBEND ROLL-MODEL YAW  
 51 5 ORBITER 02 7.91 111.0 1261 34.99 -4.99 -30.00 -100.00 -5.00

T-1AF 0-1MF 0-1MF MU-1MF MU-1MF RE/FT MREF SREF  
 (DEG R) (PSIA) (PSIA) (FT/SEC) (SLUGS/FT3) (LB-SEC/FT2) (FT-2) (R=0175EI) (R=0175EI)

91.3 -012 -536 3744 1.499E-05 7.514E-05 5.479E 05 1.788E-02 5.400E-02

CAMERA HOLL NO PAINT IFWP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHO/CAK) TRAR(ITO) BETAITO)  
 TOP(T) 7375  
 SIF(5) A302  
 MOTION(9) 7426

0.0519 1.664E-01 1.7020E-01

217

PTC AN	TIME DELTIME	M(TO)	M(TO)/MREF	M(1.910)	M(1.910)/MREF	M(1.92310)	M(1.92310)/MREF	ST(ITO)
S 3102(200)	9.66	3.051E-03	.1704	3.074E-03	.2139	3.613E-03	.2020	9.227E-03
M 3104(200)	10.29	3.060E-03	.1610	3.012E-03	.2019	3.410E-03	.1907	8.709E-03
T 0627(200)	10.71	2.876E-03	.1609	3.087E-03	.2016	3.406E-03	.1904	8.697E-03
S 3103(200)	10.71	2.876E-03	.1609	3.087E-03	.2016	3.406E-03	.1904	8.697E-03
T 0628(200)	11.76	2.728E-03	.1525	3.021E-03	.1913	3.231E-03	.1806	8.250E-03
S 3104(200)	11.76	2.728E-03	.1525	3.021E-03	.1913	3.231E-03	.1806	8.250E-03
M 3106(200)	11.76	2.728E-03	.1525	3.021E-03	.1913	3.231E-03	.1806	8.250E-03
T 0629(200)	12.81	2.601E-03	.1453	3.262E-03	.1823	3.080E-03	.1721	7.958E-03
S 3105(200)	12.81	2.601E-03	.1453	3.262E-03	.1823	3.080E-03	.1721	7.958E-03
M 3107(200)	12.81	2.601E-03	.1453	3.262E-03	.1823	3.080E-03	.1721	7.958E-03
T 0630(200)	13.87	2.400E-03	.1391	3.123E-03	.1745	2.949E-03	.1648	7.523E-03
M 3108(200)	13.87	2.400E-03	.1391	3.123E-03	.1745	2.949E-03	.1648	7.523E-03
S 3109(200)	13.87	2.400E-03	.1391	3.123E-03	.1745	2.949E-03	.1648	7.523E-03
M 3110(200)	14.52	2.340E-03	.1335	3.000E-03	.1676	2.833E-03	.1542	7.220E-03
T 0631(200)	14.54	2.340E-03	.1335	3.000E-03	.1676	2.833E-03	.1542	7.220E-03
S 3110(200)	14.54	2.340E-03	.1335	3.000E-03	.1676	2.833E-03	.1542	7.220E-03
T 0632(200)	15.59	2.303E-03	.1244	2.997E-03	.1614	2.830E-03	.1541	7.214E-03
S 3110(200)	15.59	2.303E-03	.1244	2.997E-03	.1614	2.830E-03	.1541	7.214E-03
M 3110(200)	15.59	2.303E-03	.1244	2.997E-03	.1614	2.830E-03	.1541	7.214E-03
T 0633(200)	16.71	2.225E-03	.1242	2.990E-03	.1549	2.727E-03	.1522	6.946E-03
S 3111(200)	16.71	2.225E-03	.1242	2.990E-03	.1549	2.727E-03	.1522	6.946E-03
M 3111(200)	16.71	2.225E-03	.1242	2.990E-03	.1549	2.727E-03	.1522	6.946E-03
T 0634(200)	17.07	2.223E-03	.1202	2.788E-03	.1557	2.632E-03	.1470	6.710E-03
S 3111(200)	17.07	2.223E-03	.1202	2.788E-03	.1557	2.632E-03	.1470	6.710E-03
M 3111(200)	17.07	2.223E-03	.1202	2.788E-03	.1557	2.632E-03	.1470	6.710E-03
T 0635(200)	18.12	2.154E-03	.1202	2.700E-03	.1507	2.551E-03	.1423	6.491E-03
S 3112(200)	18.12	2.154E-03	.1202	2.700E-03	.1507	2.551E-03	.1423	6.491E-03
M 3112(200)	18.12	2.154E-03	.1202	2.700E-03	.1507	2.551E-03	.1423	6.491E-03
T 0636(200)	18.12	2.152E-03	.1202	2.700E-03	.1508	2.549E-03	.1424	6.498E-03
S 3112(200)	18.12	2.152E-03	.1202	2.700E-03	.1508	2.549E-03	.1424	6.498E-03

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357

71 9173

AEOLIA (AEC-1) ARNOLD AFS, TENNESSEE  
VON KARMAN GAS DYNAMICS FACILITY  
50 INCH HYPERSONIC TUNNEL A

WAS-RI GRANTED PENDING

WA209

GROUP	CONF16	MODEL	MACH NO	PO(P31A)	TOTDEG R)	ALPHA-MODEL	ALPHA-SECTOR	ALPHA-PREBEND	ROLL-MODEL	YAW
51	5	ORBITER #2	7.91	111.2	1261	34.99	-4.99	-30.00	-180.00	-0.00

T-100	0-INF	0-INF	V-INF	RMO-INF	MU-INF	REF/1	MREF	STREF
(PSIA)	(PSIA)	(PSIA)	(FT/SEC)	(SALUS/FT3)	(LH-SEC/FT2)	(E-1)	(R <sub>2</sub> -0.175E-1)	(R <sub>2</sub> -0.175E-1)
91.3	0.12	0.53	37.64	1.102E-05	7.511E-08	5.493E 05	1.790E-02	5.471E-02

CAMERA	ROLL NO	PAINT TEMP (DEG F)	INITIAL TEMP (DEG F)	SQUARE ROOT (RHOXCAK)	YBAR(TO)	BETA(TO)
1	1	1	1	1	1	1
2	2	2	2	2	2	2
3	3	3	3	3	3	3
4	4	4	4	4	4	4
5	5	5	5	5	5	5
6	6	6	6	6	6	6
7	7	7	7	7	7	7
8	8	8	8	8	8	8
9	9	9	9	9	9	9
10	10	10	10	10	10	10
11	11	11	11	11	11	11
12	12	12	12	12	12	12
13	13	13	13	13	13	13
14	14	14	14	14	14	14
15	15	15	15	15	15	15
16	16	16	16	16	16	16
17	17	17	17	17	17	17
18	18	18	18	18	18	18
19	19	19	19	19	19	19
20	20	20	20	20	20	20
21	21	21	21	21	21	21
22	22	22	22	22	22	22
23	23	23	23	23	23	23
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25	25	25	25	25	25	25
26	26	26	26	26	26	26
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28	28	28	28	28	28	28
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30	30	30	30	30	30	30
31	31	31	31	31	31	31
32	32	32	32	32	32	32
33	33	33	33	33	33	33
34	34	34	34	34	34	34
35	35	35	35	35	35	35
36	36	36	36	36	36	36
37	37	37	37	37	37	37
38	38	38	38	38	38	38
39	39	39	39	39	39	39
40	40	40	40	40	40	40
41	41	41	41	41	41	41
42	42	42	42	42	42	42
43	43	43	43	43	43	43
44	44	44	44	44	44	44
45	45	45	45	45	45	45
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51	51	51	51	51	51	51
52	52	52	52	52	52	52
53	53	53	53	53	53	53
54	54	54	54	54	54	54
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62	62	62	62	62	62	62
63	63	63	63	63	63	63
64	64	64	64	64	64	64
65	65	65	6			

100 (H)	7/5	200	00	0519	1.664E-01	1.7020E-01
100 (S)	0302	200	00	0519	1.664E-01	1.7020E-01

6156

PIC NO	TIME	DELTIME	W(TO)	M(TO)/MREF	M(9TO)	M(9TO)/MREF	M(-923TO)	M(-923TO)/MREF	ST(1TO)
1	9435(200)	19.17	2.088E-03	.1166	2.619E-03	.1462	2.473E-03	.1381	6.298E-03
2	9436(200)	19.17	2.088E-03	.1166	2.619E-03	.1462	2.473E-03	.1381	6.298E-03
3	3111(200)	19.17	2.088E-03	.1166	2.619E-03	.1462	2.473E-03	.1381	6.298E-03
4	5123(200)	19.17	2.088E-03	.1166	2.619E-03	.1462	2.473E-03	.1381	6.298E-03
5	9436(200)	20.22	1.904	.1132	2.545E-03	.1420	2.403E-03	.1361	6.116E-03
6	5126(200)	20.22	1.904	.1132	2.545E-03	.1420	2.403E-03	.1361	6.116E-03
7	3112(200)	20.22	1.904	.1132	2.545E-03	.1420	2.403E-03	.1361	6.116E-03
8	5127(200)	20.22	1.904	.1132	2.545E-03	.1420	2.403E-03	.1361	6.116E-03
9	9437(200)	21.02	1.974E-03	.1102	2.474E-03	.1382	2.338E-03	.1305	5.949E-03
10	5130(200)	21.02	1.974E-03	.1102	2.474E-03	.1382	2.338E-03	.1305	5.949E-03
11	3113(200)	21.02	1.974E-03	.1102	2.474E-03	.1382	2.338E-03	.1305	5.949E-03
12	5134(200)	21.02	1.974E-03	.1102	2.474E-03	.1382	2.338E-03	.1305	5.949E-03
13	9438(200)	22.25	1.904	.1074	2.413E-03	.1347	2.274E-03	.1272	5.799E-03
14	5136(200)	22.25	1.904	.1074	2.413E-03	.1347	2.274E-03	.1272	5.799E-03
15	3115(200)	22.25	1.904	.1074	2.413E-03	.1347	2.274E-03	.1272	5.799E-03
16	5137(200)	22.25	1.904	.1074	2.413E-03	.1347	2.274E-03	.1272	5.799E-03
17	9439(200)	23.40	1.874E-03	.1044	2.355E-03	.1314	2.224E-03	.1240	5.651E-03
18	5140(200)	23.40	1.874E-03	.1044	2.355E-03	.1314	2.224E-03	.1240	5.651E-03
19	3116(200)	23.40	1.874E-03	.1044	2.355E-03	.1314	2.224E-03	.1240	5.651E-03
20	5141(200)	23.40	1.874E-03	.1044	2.355E-03	.1314	2.224E-03	.1240	5.651E-03
21	9440(200)	24.65	1.845E-03	.1024	2.301E-03	.1284	2.173E-03	.1212	5.524E-03
22	5143(200)	24.65	1.845E-03	.1024	2.301E-03	.1284	2.173E-03	.1212	5.524E-03
23	3117(200)	24.65	1.845E-03	.1024	2.301E-03	.1284	2.173E-03	.1212	5.524E-03
24	5144(200)	24.65	1.845E-03	.1024	2.301E-03	.1284	2.173E-03	.1212	5.524E-03
25	9441(200)	25.53	1.794E-03	.1000	2.250E-03	.1254	2.124E-03	.1184	5.396E-03
26	5147(200)	25.53	1.794E-03	.1000	2.250E-03	.1254	2.124E-03	.1184	5.396E-03
27	3118(200)	25.53	1.794E-03	.1000	2.250E-03	.1254	2.124E-03	.1184	5.396E-03
28	5148(200)	25.53	1.794E-03	.1000	2.250E-03	.1254	2.124E-03	.1184	5.396E-03
29	9442(200)	26.58	1.766E-03	.0980	2.202E-03	.1224	2.080E-03	.1160	5.294E-03
30	5150(200)	26.58	1.766E-03	.0980	2.202E-03	.1224	2.080E-03	.1160	5.294E-03
31	3119(200)	26.58	1.766E-03	.0980	2.202E-03	.1224	2.080E-03	.1160	5.294E-03
32	5151(200)	26.58	1.766E-03	.0980	2.202E-03	.1224	2.080E-03	.1160	5.294E-03
33	9443(200)	27.63	1.721E-03	.0959	2.159E-03	.1203	2.039E-03	.1136	5.171E-03
34	5153(200)	27.63	1.721E-03	.0959	2.159E-03	.1203	2.039E-03	.1136	5.171E-03
35	312								

218

359

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Group 52  
7426  
mod

$\alpha = 35^\circ$   
 $\beta = 5^\circ$

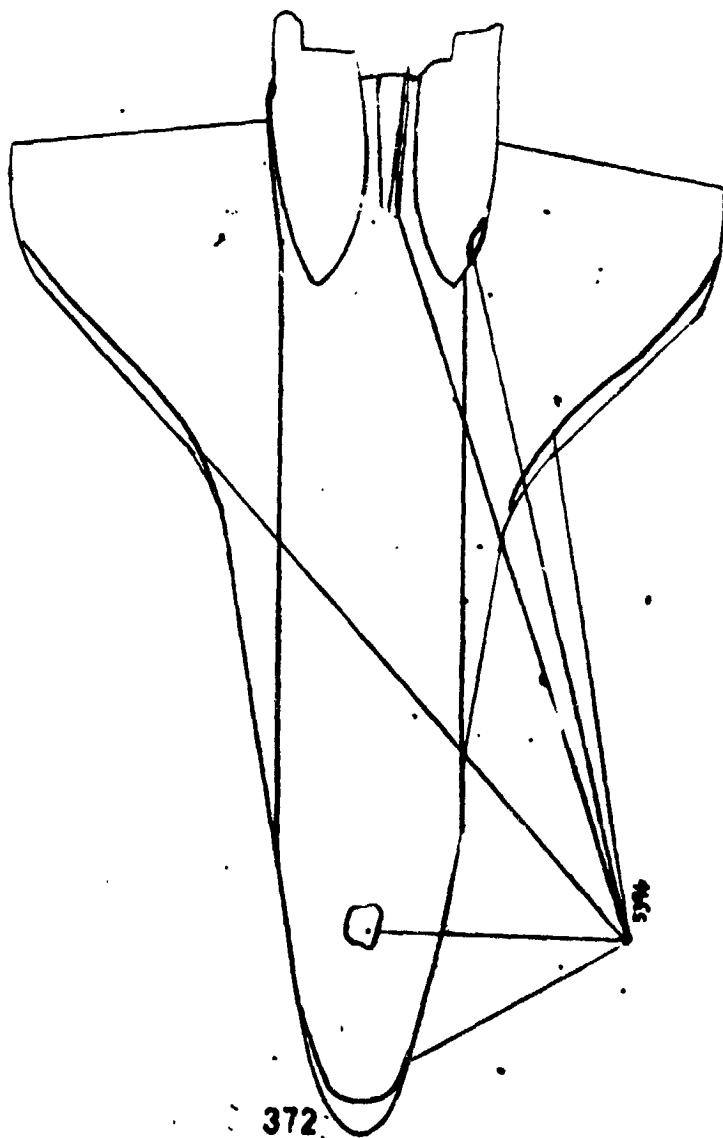


Figure 37

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7/ 9/73

NASA-RI ORBITER HEATING

AEDC(ARO-INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL R

VA2W9

GROUP CONFIG MOREL MACH NO PO(PSIA) TO(DEG R) ALPHA-MODEL ALPHA-SECTION ALPHA-PREBEND ROLL-MODEL YAW

52 2 ORBITER S 7.91 110.1 1262 24.99 -5.30 -30.00 -188.70 5.01

1-1NF P-1NF Q-1NF V-1NF RMD-1NF MU-1NF HF/FT MREF STREF

DEG R (PSIA) (FT/SEC) (LBS-SEC/FT<sup>2</sup>) (LBS-SEC/FT<sup>2</sup>) (LBS-SEC/FT<sup>2</sup>) (LBS-SEC/FT<sup>2</sup>) (LBS-SEC/FT<sup>2</sup>) (LBS-SEC/FT<sup>2</sup>)

93.4 .012 .531 3745 3745 7.517E-08 5.431E-05 1.741E-02 5.504E-02

CAMERA ROLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHOCK) TBAR(ITO) BETA(ITO)

TOP(TI) 7375

SIDE(SI) 8302

BOTTOM(BI) 7426

PIC NO TIME DELTIME H(ITO) H(ITO)/MREF H(.9TO) H(.9TO)/MREF H(.923TO) H(.923TO)/MREF ST(ITO)

T 9451(150) 1.15 MODEL HAS NOT REACHED CENTERLINE

S 3127(150) 1.15 MODEL HAS NOT REACHED CENTERLINE

M 5369(150) 1.18 MODEL HAS NOT REACHED CENTERLINE

T 9452(150) 2.23 MODEL HAS NOT REACHED CENTERLINE

S 3128(150) 2.23 MODEL HAS NOT REACHED CENTERLINE

M 5370(150) 2.23 MODEL HAS NOT REACHED CENTERLINE

INJECT TIME = 2.23

T 9453(150) 3.28 DATA NOT YET VALID

M 5371(150) 3.28 DATA NOT YET VALID

S 3129(150) 3.30 DATA NOT YET VALID

T 9454(150) 4.26 3.08 2.634E-03 .1477 3.250E-03 .1923 3.082E-03 .1728 8.037E-03

S 3130(150) 4.26 3.08 2.634E-03 .1477 3.250E-03 .1923 3.082E-03 .1728 8.037E-03

M 5372(150) 4.26 3.08 2.634E-03 .1477 3.250E-03 .1923 3.082E-03 .1728 8.037E-03

T 9455(150) 5.41 4.13 2.274E-03 .1275 2.808E-03 .1573 2.661E-03 .1492 6.939E-03

S 3131(150) 5.41 4.13 2.274E-03 .1275 2.808E-03 .1573 2.661E-03 .1492 6.939E-03

M 5373(150) 5.41 4.13 2.274E-03 .1275 2.808E-03 .1573 2.661E-03 .1492 6.939E-03

T 9456(150) 6.46 5.18 2.030E-03 .1134 2.505E-03 .1464 2.375E-03 .1331 6.189E-03

S 3132(150) 6.46 5.18 2.030E-03 .1134 2.505E-03 .1464 2.375E-03 .1331 6.189E-03

M 5374(150) 6.46 5.18 2.030E-03 .1134 2.505E-03 .1464 2.375E-03 .1331 6.189E-03

T 9457(150) 7.51 6.21 1.847E-03 .1035 2.279E-03 .1278 2.161E-03 .1211 5.632E-03

S 3133(150) 7.51 6.21 1.847E-03 .1035 2.279E-03 .1278 2.161E-03 .1211 5.632E-03

M 5375(150) 7.51 6.21 1.847E-03 .1035 2.279E-03 .1278 2.161E-03 .1211 5.632E-03

T 9458(150) 8.58 7.31 1.709E-03 .0957 2.109E-03 .1182 2.000E-03 .1120 5.206E-03

S 3134(150) 8.58 7.31 1.709E-03 .0957 2.109E-03 .1182 2.000E-03 .1120 5.206E-03

M 5376(150) 8.58 7.31 1.709E-03 .0957 2.109E-03 .1182 2.000E-03 .1120 5.206E-03

T 9459(150) 9.64 8.36 1.528E-03 .0895 1.972E-03 .1105 1.870E-03 .1048 4.868E-03

S 3135(150) 9.64 8.36 1.528E-03 .0895 1.972E-03 .1105 1.870E-03 .1048 4.868E-03

M 5377(150) 9.64 8.36 1.528E-03 .0895 1.972E-03 .1105 1.870E-03 .1048 4.868E-03

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7/ 9/73

MEODIARCO, INC.) ARNOLD AFS, TENNESSEE  
VON KARMAN GAS DYNAMICS FACILITY  
50 INCH HYPERSONIC TUNNEL A

50 INCH HYPERSONIC TUNNEL A

GROUP	CONFIG	MODEL	MACH NO	DO(PSIA)	T0( DEG R)	ALPHA-MODEL	ALPHA-SECTION	ALPHA-PREBEND
52	2	GREITEN S	7.91	110.6	1262	34.99	-5.30	-30.00

CAMERA	ROLL NO	PAINT IFMP (DEG F)	INITIAL TEMP (DEG F)	SQUARE ROOT (RHOXCCK)	TRANS(TO)
TOP(1)	7375				
SIDE(5)	8302	150	80	0.0496	9.697E-8
BOTTOM(8)	7426				

221

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NASA-RI ORBITER HEATING

VA289

AEDCI(ARINC-1) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL R

GROUP COMFTE MODEL MACH NO PO(PSIA) TO( DEG R) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREBEND ROLL-MODEL YAW  
 52 2 ORBITER S 7.91 111.0 1262 24.99 -5.30 -30.00 -100.70 5.01

T-INF P-INF Q-INF V-INF MU-INF RHO-INF RF/F\* MREF STREF  
 (DEG R) (PSIA) (PSIA) (FT/SEC) (SLUGS/FT2) (LB-SEC/FT2) (FT-L) (R= .0175FI) (H= .0175FI)  
 93.4 .012 .536 .375 1.199E-05 7.518E-08 5.475E 05 1.788E-02 5.482E-02

CAPERA ROLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHOXCAK) TRAR(ITO) BETA(ITO)  
 TOP(IT) 7375  
 SIDE(S) 8302 150  
 MOTION(M) 7426 .0496 9.597E-02 9.3126E-02

PTC NO	TIME	DELTIME	M(ITO)	M(ITO)/MREF	M(.9TO)	M(.9TO)/MREF	M(.923TO)	M(.923TO)/MREF	ST(ITO)
T 946R(150)	19.20	17.92	1.041E-03	.0610	1.347E-03	.0753	1.277E-03	.0714	3.313E-03
S 314A(150)	19.20	17.92	1.091E-03	.0610	1.347E-03	.0753	1.277E-03	.0714	3.313E-03
M 53M(150)	19.20	17.92	1.041E-03	.0610	1.347E-03	.0753	1.277E-03	.0714	3.313E-03
M 5307(150)	20.25	18.97	1.061E-03	.0593	1.309E-03	.0732	1.241E-03	.0694	3.219E-03
S 3145(150)	20.25	18.97	1.061E-03	.0593	1.309E-03	.0732	1.241E-03	.0694	3.219E-03
T 9470(150)	21.30	20.02	1.032E-03	.0577	1.273E-03	.0712	1.207E-03	.0675	3.132E-03
M 53M(150)	21.32	20.05	1.032E-03	.0577	1.273E-03	.0712	1.207E-03	.0675	3.132E-03
T 9471(150)	22.30	21.10	1.006E-03	.0562	1.241E-03	.0694	1.177E-03	.0658	3.050E-03
S 3147(150)	22.30	21.10	1.006E-03	.0562	1.241E-03	.0694	1.177E-03	.0658	3.050E-03
M 53M(150)	22.30	21.10	1.006E-03	.0562	1.241E-03	.0694	1.177E-03	.0658	3.050E-03
T 9472(150)	23.73	22.45	9.749E-04	.0545	1.203E-03	.0673	1.141E-03	.0638	2.957E-03
S 314M(150)	23.73	22.45	9.749E-04	.0545	1.203E-03	.0673	1.141E-03	.0638	2.957E-03
M 53M(150)	23.73	22.45	9.749E-04	.0545	1.203E-03	.0673	1.141E-03	.0638	2.957E-03
T 9473(150)	25.75	24.48	9.337E-04	.0522	1.152E-03	.0644	1.093E-03	.0611	2.832E-03
S 3149(150)	25.75	24.48	9.337E-04	.0522	1.152E-03	.0644	1.093E-03	.0611	2.832E-03
M 53M(150)	25.75	24.48	9.337E-04	.0522	1.152E-03	.0644	1.093E-03	.0611	2.832E-03
T 9474(150)	27.78	26.50	8.972E-04	.0501	1.107E-03	.0619	1.050E-03	.0586	2.716E-03
S 3150(150)	27.78	26.50	8.972E-04	.0501	1.107E-03	.0619	1.050E-03	.0586	2.716E-03
M 53M(150)	27.78	26.50	8.972E-04	.0501	1.107E-03	.0619	1.050E-03	.0586	2.716E-03
T 9475(150)	29.83	28.54	8.648E-04	.0483	1.067E-03	.0596	1.012E-03	.0565	2.616E-03
S 3151(150)	29.83	28.54	8.648E-04	.0483	1.067E-03	.0596	1.012E-03	.0565	2.616E-03
M 53M(150)	29.83	28.54	8.648E-04	.0483	1.067E-03	.0596	1.012E-03	.0565	2.616E-03
T 9476(150)	31.84	30.54	8.356E-04	.0467	1.031E-03	.0576	9.778E-04	.0546	2.530E-03
S 3152(150)	31.84	30.54	8.356E-04	.0467	1.031E-03	.0576	9.778E-04	.0546	2.530E-03
M 53M(150)	31.84	30.54	8.356E-04	.0467	1.031E-03	.0576	9.778E-04	.0546	2.530E-03

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NASA-RL ORBITER PEATINE

91209

AEDC(AR.O,INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL N

GROUP COMF16 MODEL MACH NO PO(PSIA) TO(DEG R) ALPHA-MODEL ALPHA-SECTION ALPHA-PREBEND ROLL-MODEL YAW  
 57 2 ORBITER S 7.91 111.2 1262 24.99 -5.30 -30.00 -188.70 5.01

T-INF P-INF Q-INF R-INF MU-INF RE/FT MREF STREF  
 (DEG R) (P-IA) (P-IA) (P-IA) (SLUGS/FT) (LH-SEC/FT) (FT-1) (R-0175FT) (R-0175FT)  
 93.4 .012 .537 3745 1.102E-05 7.517E-08 5.490E 05 1.791E-02 5.474E-02

CAMERA HOLL NO PAINT (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (IN/SEC) TRAR(10) BETA(10)  
 TOP(T) 7375 150 80 9.697E-02 9.3126E-02  
 SIDE(S) 8302  
 MOTION(M) 7426

PIC NO	TIME DELTIME	H(10)	H(10)/MREF	H(10)	H(10)/MREF	H(10)	H(10)/MREF	H(10)	H(10)/MREF	H(10)	H(10)/MREF	ST(10)
S 3152(150)	31.86	30.58	0.466	1.031E-03	0.575	9.774E-04	0.546	2.527E-03				
M 5395(150)	33.86	32.59	0.452	9.986E-04	0.557	9.469E-04	0.528	2.445E-03				
T 9477(150)	33.89	32.61	0.452	9.986E-04	0.557	9.469E-04	0.529	2.449E-03				
S 3153(150)	33.89	32.61	0.452	9.986E-04	0.557	9.469E-04	0.529	2.449E-03				
T 9478(150)	35.87	34.59	0.438	9.693E-04	0.541	9.191E-04	0.513	2.375E-03				
S 3154(150)	35.87	34.59	0.438	9.693E-04	0.541	9.191E-04	0.513	2.375E-03				
M 5396(150)	35.87	34.59	0.438	9.693E-04	0.541	9.191E-04	0.513	2.375E-03				
T 9479(150)	37.89	36.61	0.426	9.421E-04	0.525	8.933E-04	0.498	2.305E-03				
S 3155(150)	37.89	36.61	0.426	9.421E-04	0.525	8.933E-04	0.498	2.305E-03				
M 5397(150)	37.89	36.61	0.426	9.421E-04	0.525	8.933E-04	0.498	2.305E-03				
S 3156(150)	39.52	38.64	0.415	9.170E-04	0.512	8.695E-04	0.485	2.246E-03				
M 5398(150)	39.52	38.64	0.415	9.170E-04	0.512	8.695E-04	0.485	2.246E-03				
T 9480(150)	39.55	38.67	0.414	9.147E-04	0.511	8.692E-04	0.485	2.243E-03				

MODEL WAS LEFT CENTERLINE

223

376

Comp 53  
7375  
10°

8598  
 $\alpha = 35^\circ$   
 $\phi = 0^\circ$

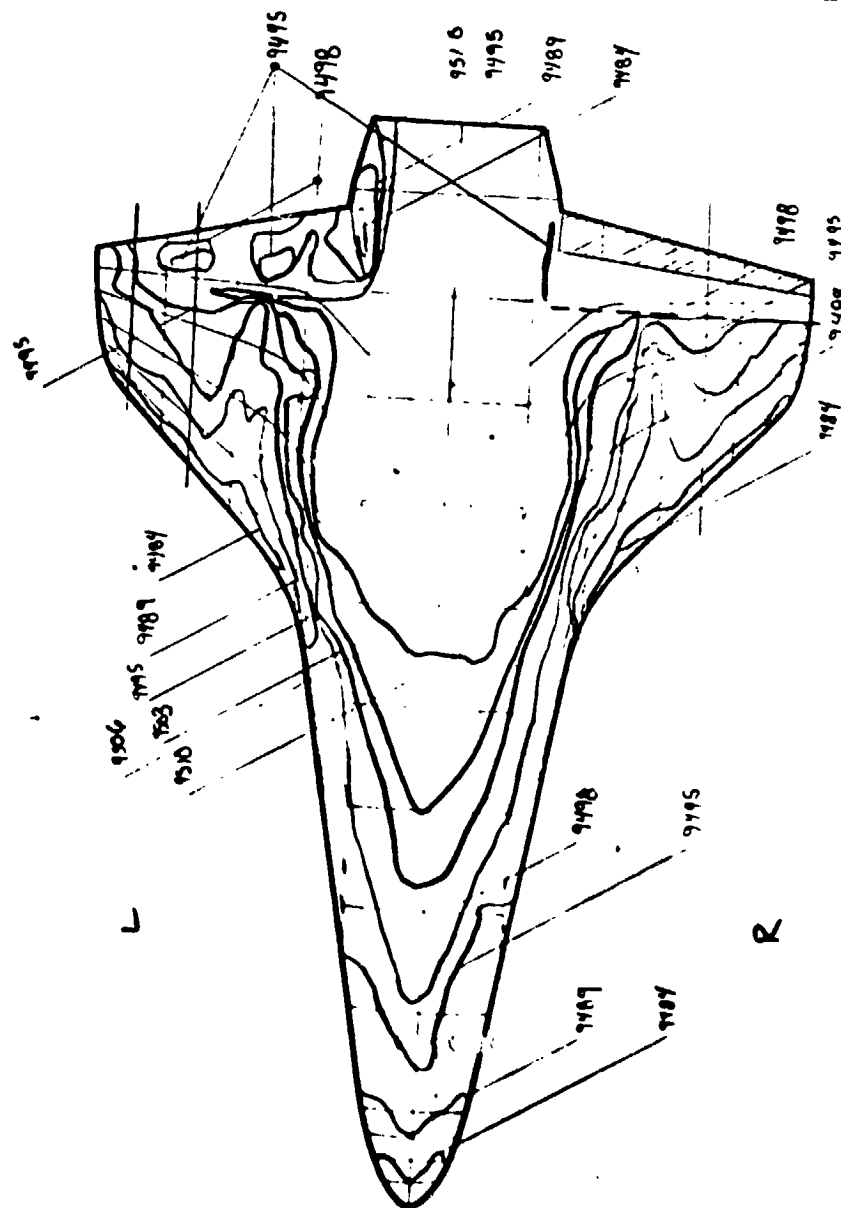


Figure 38

Group 53  
7426  
E model

4531  
 $\alpha = 35^\circ$   
 $\phi = 0^\circ$

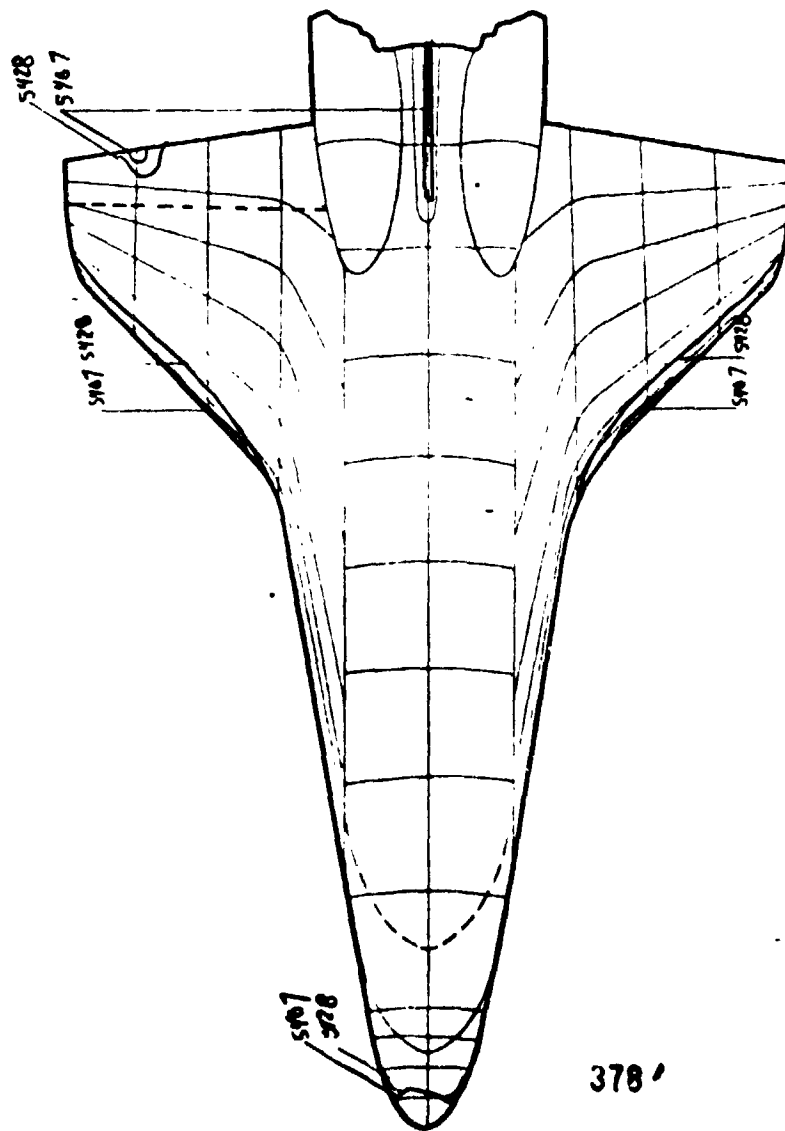


Figure 39

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NASA-RI ORBITER HEATING

AEDCIARO-INC.) ARNOLD AFS, TENNESSEE  
VON KARMAN GAS DYNAMICS FACILITY  
50 INCH HYPERSONIC TUNNEL R

VA209

GROUP CMFTE MODEL MACH NO PG:PSIA T0(DEG R) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREBEND ROLL-MODEL YAW  
53 3 ORBITER E 7.91 110.1 1262 35.03 -5.03 -30.00 -100.00 -0.00

T-INF P-INF O-INF V-INF MU-INF RHO-INF RE/FT MREF STREF  
(DEG R) (PSIA) (FT/SEC) (LBS/FT3) (LBS/SEC/FT2) (FT-LB) (R=,DLT5FT) (R=,DLT5FT)  
93.4 .012 .531 3746 1.090E-05 7.519E-08 5.429E-05 1.741E-02 5.505E-02

CAMERA ROLL NO PAINT IFMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHOXCHK) T8AR(TO) BETA(TO)  
TOP(T) 7375  
SIDE(S) 8302  
BOTTOM(B) 7426  
175 79 .0509 1.320E-01 1.3164E-01

PIC NO	TIME DELTIME	H(TO)	H(TO)/MREF	H(.9TO)	H(.9TO)/MREF	H(.923TO)	H(.923TO)/MREF	ST(TO)
T 9490(175)	10.71	9.42	2.143E-03	.1226	2.715E-03	.1524	2.509E-03	.1443
M 9409(175)	10.71	9.42	2.143E-03	.1226	2.715E-03	.1524	2.509E-03	.1443
S 3166(175)	10.74	9.44	2.140E-03	.1225	2.711E-03	.1523	2.506E-03	.1441
M 9409(175)	11.76	10.47	2.071E-03	.1161	2.575E-03	.1444	2.437E-03	.1366
T 9491(175)	11.79	10.54	2.068E-03	.1162	2.572E-03	.1445	2.434E-03	.1367
S 3167(175)	11.79	10.54	2.068E-03	.1162	2.572E-03	.1445	2.434E-03	.1367
T 9492(175)	12.64	11.55	1.972E-03	.1107	2.452E-03	.1377	2.321E-03	.1303
S 3168(175)	12.64	11.55	1.972E-03	.1107	2.452E-03	.1377	2.321E-03	.1303
M 9410(175)	12.64	11.55	1.972E-03	.1107	2.452E-03	.1377	2.321E-03	.1303
T 9493(175)	13.69	12.64	1.888E-03	.1059	2.347E-03	.1317	2.222E-03	.1247
M 9411(175)	13.69	12.64	1.888E-03	.1059	2.347E-03	.1317	2.222E-03	.1247
S 3169(175)	13.62	12.62	1.846E-03	.1058	2.345E-03	.1316	2.219E-03	.1246
M 9412(175)	14.74	13.45	1.814E-03	.1017	2.255E-03	.1265	2.134E-03	.1197
T 9494(175)	14.97	13.67	1.812E-03	.1017	2.253E-03	.1264	2.132E-03	.1197
S 3170(175)	14.97	13.67	1.812E-03	.1017	2.253E-03	.1264	2.132E-03	.1197
T 9495(175)	16.02	14.73	1.746E-03	.0980	2.171E-03	.1219	2.055E-03	.1153
M 9413(175)	16.02	14.73	1.746E-03	.0980	2.171E-03	.1219	2.055E-03	.1153
S 3171(175)	16.02	14.73	1.746E-03	.0980	2.171E-03	.1219	2.055E-03	.1153
T 9496(175)	17.07	15.78	1.677E-03	.0947	2.097E-03	.1177	1.985E-03	.1114
M 9414(175)	17.07	15.78	1.677E-03	.0947	2.097E-03	.1177	1.985E-03	.1114
S 3172(175)	17.09	15.80	1.646E-03	.0944	2.094E-03	.1176	1.984E-03	.1113
T 9497(175)	18.12	16.83	1.633E-03	.0915	2.031E-03	.1139	1.922E-03	.1078
M 9415(175)	18.15	16.85	1.632E-03	.0915	2.029E-03	.1138	1.921E-03	.1077
S 3173(175)	18.15	16.85	1.632E-03	.0915	2.029E-03	.1138	1.921E-03	.1077
T 9498(175)	19.20	17.94	1.573E-03	.0888	1.969E-03	.1104	1.864E-03	.1045
M 9416(175)	19.20	17.94	1.573E-03	.0888	1.969E-03	.1104	1.864E-03	.1045
S 3174(175)	19.20	17.94	1.573E-03	.0888	1.969E-03	.1104	1.864E-03	.1045
T 9499(175)	19.20	17.94	1.573E-03	.0888	1.969E-03	.1104	1.864E-03	.1045
M 9417(175)	19.20	17.94	1.573E-03	.0888	1.969E-03	.1104	1.864E-03	.1045
S 3175(175)	19.20	17.94	1.573E-03	.0888	1.969E-03	.1104	1.864E-03	.1045

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WASA-RI ORBITER PEATING

W2249

AEDCI(ARO-INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL R

GROUP CNMT6 MODEL MACH NO P0(P5IA) T0(IDEG R) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREBEND ROLL-MODEL YAW  
 53 3 ORBITER E 7.91 110.4 1262 35.03 -5.03 -30.00 -180.00 -0.00

T-1AF P-1NF Q-1NF V-1NF RNO-1NF MU-1NF RF/FT MREF STREF  
 (DEG R) (PSIA) (PSIA) (EI/SEC) (SLUGS/EI) (LH-SEC/EI) (EI-1) (R-017SEI) (R-017SEI)

93.4 .012 .533 3744 1.003E-05 7.520E-08 5.443E 05 1.783E-02 5.498E-02

CAMERA ROLL NO PAINT (FMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHO/CAK) TRANSITIO BETAITO)

7375  
 8302  
 7428  
 175 79 .0599 1.328E-01 1.3164E-01

381

225

PIC NO	TIME DELTIME	M(TO)	M(TO)/MREF	M(-9TO)	M(-9TO)/MREF	M(-923TO)	M(-923TO)/MREF	ST(TO)
T 9499(175)	20.25	1.539E-03	.0863	1.914E-03	.1073	1.811E-03	.1015	4.087E-03
M 5417(175)	20.25	1.539E-03	.0863	1.914E-03	.1073	1.811E-03	.1015	4.087E-03
S 3175(175)	20.27	1.538E-03	.0863	1.912E-03	.1073	1.810E-03	.1015	4.092E-03
T 9500(175)	21.22	1.497E-03	.0839	1.881E-03	.1044	1.762E-03	.0988	4.564E-03
S 3176(175)	21.32	1.497E-03	.0839	1.881E-03	.1044	1.762E-03	.0988	4.564E-03
M 5418(175)	21.32	1.497E-03	.0839	1.881E-03	.1044	1.762E-03	.0988	4.564E-03
T 9501(175)	22.30	1.459E-03	.0810	1.814E-03	.1017	1.717E-03	.0963	4.444E-03
S 3177(175)	22.30	1.459E-03	.0810	1.814E-03	.1017	1.717E-03	.0963	4.444E-03
M 5419(175)	22.30	1.459E-03	.0810	1.814E-03	.1017	1.717E-03	.0963	4.444E-03
T 9502(175)	23.43	1.424E-03	.0798	1.771E-03	.0992	1.674E-03	.0939	4.334E-03
M 5420(175)	23.45	1.423E-03	.0798	1.770E-03	.0992	1.675E-03	.0939	4.339E-03
S 3178(175)	23.45	1.423E-03	.0798	1.770E-03	.0992	1.675E-03	.0939	4.339E-03
T 9503(175)	24.50	1.391E-03	.0780	1.729E-03	.0970	1.637E-03	.0918	4.239E-03
M 5421(175)	24.50	1.391E-03	.0780	1.729E-03	.0970	1.637E-03	.0918	4.239E-03
S 3179(175)	24.50	1.391E-03	.0780	1.729E-03	.0970	1.637E-03	.0918	4.239E-03
T 9504(175)	25.55	1.340E-03	.0763	1.681E-03	.0948	1.601E-03	.0898	4.147E-03
M 5422(175)	25.55	1.340E-03	.0763	1.681E-03	.0948	1.601E-03	.0898	4.147E-03
S 3180(175)	25.58	1.340E-03	.0763	1.681E-03	.0947	1.600E-03	.0896	4.137E-03
T 9505(175)	26.63	1.311E-03	.0746	1.655E-03	.0927	1.567E-03	.0878	4.050E-03
S 3181(175)	26.63	1.311E-03	.0746	1.655E-03	.0927	1.567E-03	.0878	4.050E-03
M 5423(175)	26.63	1.311E-03	.0746	1.655E-03	.0927	1.567E-03	.0878	4.050E-03
T 9506(175)	28.53	1.244E-03	.0719	1.596E-03	.0904	1.511E-03	.0846	3.906E-03
M 5424(175)	28.53	1.244E-03	.0719	1.596E-03	.0904	1.511E-03	.0846	3.906E-03
S 3182(175)	28.53	1.244E-03	.0719	1.596E-03	.0904	1.511E-03	.0846	3.906E-03
T 9507(175)	30.56	1.239E-03	.0694	1.540E-03	.0863	1.454E-03	.0817	3.769E-03
M 5425(175)	30.56	1.239E-03	.0694	1.540E-03	.0863	1.454E-03	.0817	3.769E-03
S 3183(175)	30.56	1.239E-03	.0694	1.540E-03	.0863	1.454E-03	.0817	3.769E-03

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NASA-RI ORBITER PEATING

V4280

AEDC (ARO, INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL #

GROUP COMP16 MODEL MACH NO P0(PSTA) T0(DEG R) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREBEND ROLL-MODEL YAW  
 51 3 ORBITER E 7.91 110.6 1262 35.03 -5.03 -30.00 -189.00 -0.00  
 T-1AF P-1NF Q-1NF V-1NF RHO-1NF MU-1NF RF/FT MREF STREF  
 (DEG M) (PSTA) (PSIA) (FT/SEC) (SLUGS/FT3) (LB-SEC/FT2) (FT-1) (R= .0175EI) (R= .0175EI)  
 93.4 .012 .534 3764 1.095E-05 7.519E-08 5.453E 05 1.785E-02 5.493E-02  
 CAMERA ROLL NO PAINT IFMP (DEG F) INITIAL IEPP (DEG F) SQUARE ROOT (RHOACAK) TRAR(TO) BETA(TO)  
 7375  
 8302  
 7426 1.75 79 .0500 1.328E-01 1.3164E-01

PIC NO TIME DELTIME M(TO) MREF M1(9TO) M1(9TO)/MREF M1(.923TO) M1(.923TO)/MREF ST(TO)  
 T 408(175) 32.59 31.29 1.148E-03 .0671 1.489E-03 .0634 1.410E-03 .0789 3.641E-03  
 M 424(175) 32.59 31.29 1.148E-03 .0671 1.489E-03 .0634 1.410E-03 .0789 3.641E-03  
 S 318(175) 32.59 31.29 1.147E-03 .0672 1.489E-03 .0634 1.409E-03 .0789 3.640E-03  
 T 5427(175) 34.61 33.32 1.141E-03 .0649 1.443E-03 .0607 1.366E-03 .0764 3.523E-03  
 T 9409(175) 34.64 33.35 1.160E-03 .0650 1.443E-03 .0608 1.366E-03 .0765 3.527E-03  
 S 3185(175) 34.64 33.35 1.160E-03 .0650 1.443E-03 .0608 1.366E-03 .0765 3.527E-03  
 T 9510(175) 36.64 35.35 1.127E-03 .0631 1.401E-03 .0785 1.326E-03 .0743 3.429E-03  
 M 4280(175) 36.64 35.35 1.127E-03 .0631 1.401E-03 .0785 1.326E-03 .0743 3.429E-03  
 S 3186(175) 36.67 35.37 1.127E-03 .0631 1.401E-03 .0785 1.326E-03 .0742 3.428E-03  
 MODEL HAS LEFT CENTERLINE  
 T 9511(175) 38.67 37.38 1.046E-03 .0613 1.363E-03 .0743 1.290E-03 .0722 3.329E-03  
 M 5424(175) 38.67 37.38 1.046E-03 .0613 1.363E-03 .0743 1.290E-03 .0722 3.329E-03  
 S 3187(175) 38.69 37.44 1.046E-03 .0613 1.362E-03 .0742 1.289E-03 .0722 3.328E-03  
 M 9430(175) 40.70 39.44 1.067E-03 .0597 1.327E-03 .0743 1.256E-03 .0703 3.239E-03  
 T 9512(175) 40.72 39.44 1.067E-03 .0598 1.327E-03 .0743 1.256E-03 .0703 3.244E-03  
 S 3188(175) 40.72 39.44 1.067E-03 .0598 1.327E-03 .0743 1.256E-03 .0703 3.244E-03

227

382

8302  
GP54  
CWC

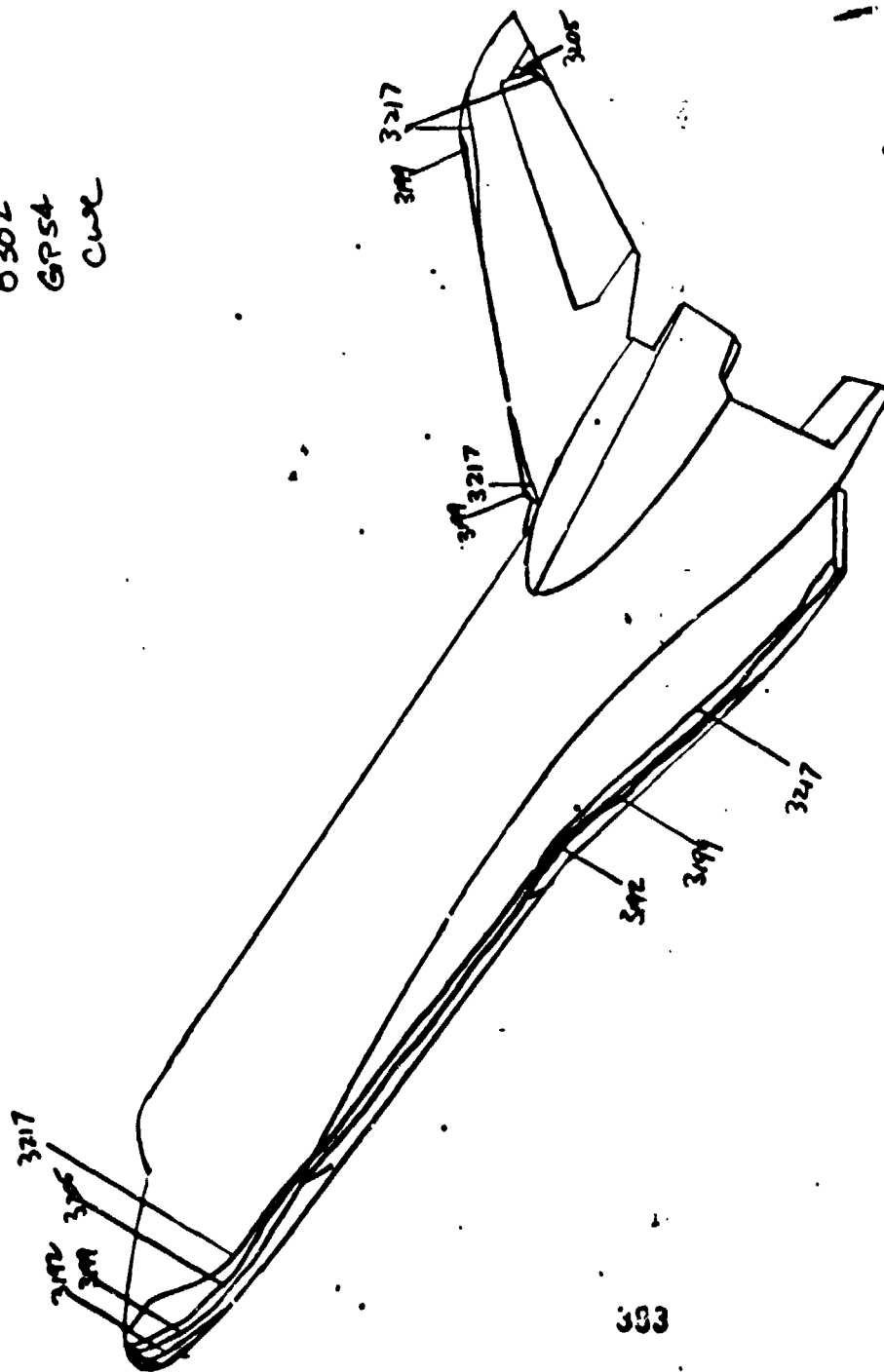
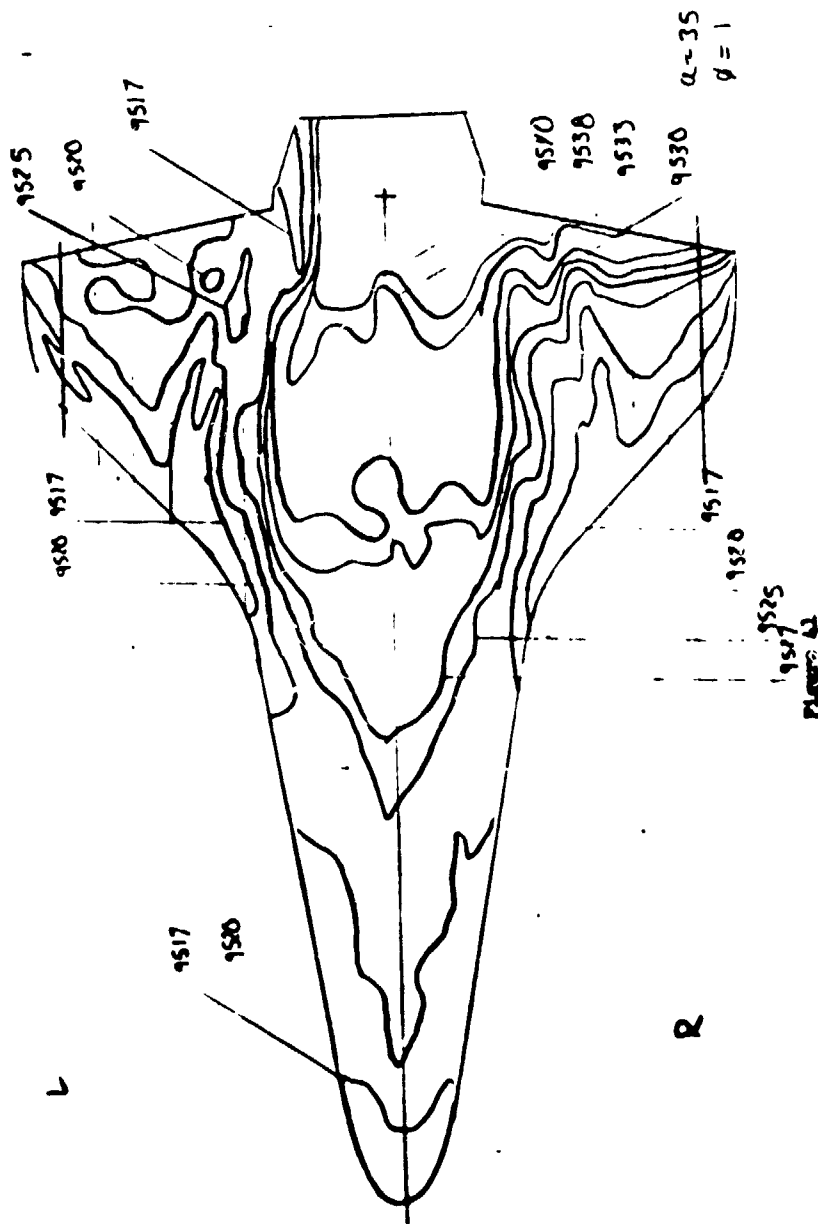


Figure 40

Group 54  
7375



9525  
9517  
9520

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7/ 9/73

NASA-R1 ORBITER HEATING

AFDC (AMC INC.) ARNOLD AFB, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL N

84200

GROUP CONFIG MODEL MACH NO P (PSIA) T (DEG R) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREREND ROLL-MODEL YAW

54 2 ORBITER S 7.91 110.2 1263 35.01 -5.02 -30.00 -101.00 1.03

T-1AF P-1MF O-1MF RHO-1MF MU-1MF RE/FT MRFF STREF

(DEG R) (PSIA) (FT/SEC) (SLUGS/FT<sup>3</sup>) (L4-SEC/FT<sup>2</sup>) (FT-1) (IN-0.175FT) (IN-0.175FT)

03.6 -0.12 -0.532 1764 1.000E-05 7.52E-04 5.43E 05 1.74E-02 5.504E-02

CAMERA ROLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHO/CXK) TRAR(TO) BETA(TO)

TOP(T) 7375 159 79 0.0466 0 0

NOC(FS) 0302

MOTOM(B) 7426

M(-910)/HREF M(-923TO) M(-923TO)/HREF ST(TO)

M(TO)/HREF M(-910)

TIME RELTIME

MODEL HAS NOT REACHED CENTERLINE

MODEL HAS NOT REACHED CENTERLINE

MODEL HAS NOT REACHED CENTERLINE

MODEL HAS NOT REACHED CENTERLINE

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7/ 9/73

NASA-R1 ORBITER HEATING

VA289

AEDC(ARO,INC.) ARNOLD AFS, TENNESSEE  
VON KARMAN GAS DYNAMICS FACILITY  
50 INCH HYPERSONIC TUNNEL H

GROUP CONFIG MODEL MACH NO PO(PISA) TO(DEG R) ALP-A-MOUEL ALPHA-SECTOR ALPHA-PREREND ROLL-MODEL YAW  
54 2 ORBITER S 7.91 110.5 1262 35.01 -5.02 -30.00 -181.80 1.03  
T-INF P-INF Q-INF V-INF RHO-INF MU-INF RE/FT HREF STREF  
(DEG R) (PSIA) (FT/SEC) (SLUGS/FT3) (LB-SEC/FT2) (FT-1) (R= .0175FT) (R= .0175FT)  
93.4 .012 .533 3744 1.093F-05 7.521F-02 5.446E 05 1.784E-02 5.496E-02  
CAMERA ROLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHO/CXK) TBAR(TO) BETA(TO)  
TOP(T) 7375  
SIDE(S) 8302  
BOTTOM(B) 7426 150 79 .0496 9.813E-02 9.4328E-02

PTC NO TIME DELTIME H(TO) H(TO)/HREF H(-910) H(-910)/HREF H(-923TO) H(-923TO)/HREF ST(TO)  
S 3197(150) 9.66 8.37 1.617F-03 .0907 1.995E-03 .1119 1.893E-03 .1061 4.938E-03  
M 5440(150) 10.69 9.39 1.526F-03 .0855 1.883E-03 .1055 1.787E-03 .1001 4.656E-03  
T 9522(150) 10.11 9.42 1.524F-03 .0855 1.880E-03 .1054 1.784E-03 .1000 4.654E-03  
S 3194(150) 10.71 9.42 1.524E-03 .0855 1.880E-03 .1054 1.784E-03 .1000 4.654E-03  
T 9523(150) 11.76 10.47 1.446E-03 .0813 1.784E-03 .1002 1.692E-03 .0951 4.434E-03  
M 5441(150) 11.76 10.47 1.446E-03 .0813 1.784E-03 .1002 1.692E-03 .0951 4.434E-03  
T 9524(150) 11.76 10.47 1.446E-03 .0813 1.784E-03 .1002 1.692E-03 .0951 4.434E-03  
M 5442(150) 12.81 11.52 1.378E-03 .0772 1.708E-03 .0953 1.613E-03 .0904 4.204E-03  
T 9525(150) 12.81 11.52 1.378E-03 .0772 1.708E-03 .0953 1.613E-03 .0904 4.204E-03  
S 3200(150) 12.84 11.55 1.377E-03 .0772 1.707E-03 .0952 1.612E-03 .0903 4.200E-03  
T 9526(150) 13.87 12.57 1.319F-03 .0739 1.624E-03 .0912 1.544E-03 .0866 4.055E-03  
M 5443(150) 13.87 12.57 1.319F-03 .0739 1.624E-03 .0912 1.544E-03 .0866 4.055E-03  
T 9527(150) 13.87 12.57 1.319F-03 .0739 1.624E-03 .0912 1.544E-03 .0866 4.055E-03  
M 5444(150) 14.94 13.65 1.266E-03 .0710 1.562E-03 .0875 1.482E-03 .0831 3.863E-03  
T 9528(150) 14.94 13.65 1.266E-03 .0710 1.562E-03 .0875 1.482E-03 .0831 3.863E-03  
S 3202(150) 14.94 13.65 1.266E-03 .0710 1.562E-03 .0875 1.482E-03 .0831 3.863E-03  
T 9529(150) 15.99 14.74 1.220F-03 .0684 1.505E-03 .0844 1.428E-03 .0801 3.725E-03  
M 5445(150) 15.99 14.74 1.220F-03 .0684 1.505E-03 .0844 1.428E-03 .0801 3.725E-03  
T 9530(150) 16.02 14.72 1.219F-03 .0683 1.504E-03 .0843 1.427E-03 .0800 3.719E-03  
M 5446(150) 17.04 15.74 1.179F-03 .0661 1.454E-03 .0815 1.380E-03 .0773 3.596E-03  
T 9531(150) 17.07 15.78 1.178F-03 .0660 1.453E-03 .0814 1.379E-03 .0772 3.593E-03  
S 3204(150) 18.10 16.80 1.141F-03 .0640 1.408E-03 .0789 1.336E-03 .0749 3.481E-03  
T 9532(150) 18.12 16.83 1.141F-03 .0639 1.407E-03 .0788 1.335E-03 .0748 3.476E-03  
M 5447(150) 18.12 16.83 1.141F-03 .0639 1.407E-03 .0788 1.335E-03 .0748 3.476E-03  
T 9533(150) 18.12 16.83 1.141F-03 .0639 1.407E-03 .0788 1.335E-03 .0748 3.476E-03

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AEDC(ARINC-1) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL N

NASA-RI ORBITER PEATING  
 VA289

GROUP CONFIG MODEL MACH NO PO(PISA) TO(DEG R) ALPHA-MODEL ALPHA-SECTION ALPHA-PREBEND ROLL-MODEL YAW  
 54 2 ORBITER S 7.91 110.6 1263 35.01 -5.02 -30.00 -181.80 1.03  
 T-INF P-INF Q-INF V-INF MU-INF RE/FT MREF STREF  
 (DEG R) (PSIA) (FT/SEC) (SLUGS/FT<sup>3</sup>) (LR=SEC/FT<sup>2</sup>) (FI-1) (R=0.175EI) (H=0.175EI)  
 93.4 .012 .534 37.7 1.094F-05 7.523F-06 5.449E 05 1.785E-02 5.495E-02

CAMERA ROLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHOKCCK) THAR(TO) BETA(TO)  
 TOP(T) 7375  
 SIDE(S) 8302  
 MOTTOM(9) 7426  
 .0496 9.813E-02 9.4328E-02

PTC NO	TIME	MELTIME	M(TO)	M(TO)/MREF	M(.910)	M(.910)/MREF	H(.923TO)	H(.923TO)/MREF	ST(TO)
T 9530(150)	19.17	17.88	1.106E-03	.0489	1.365E-03	.0765	1.295E-03	.0725	3.372E-03
S 3208(150)	19.17	17.88	1.106E-03	.0479	1.365E-03	.0765	1.295E-03	.0725	3.372E-03
M 5448(150)	19.17	17.88	1.106E-03	.0479	1.365E-03	.0765	1.295E-03	.0725	3.372E-03
T 9531(150)	20.22	18.97	1.075E-03	.0492	1.326E-03	.0743	1.259E-03	.0705	3.274E-03
S 3209(150)	20.22	18.97	1.075E-03	.0492	1.326E-03	.0743	1.259E-03	.0705	3.274E-03
M 5449(150)	20.22	18.97	1.075E-03	.0492	1.326E-03	.0743	1.259E-03	.0705	3.274E-03
T 9532(150)	21.27	19.98	1.047E-03	.0586	1.291E-03	.0723	1.235E-03	.0686	3.190E-03
S 3210(150)	21.27	19.98	1.047E-03	.0586	1.291E-03	.0723	1.235E-03	.0686	3.190E-03
M 5450(150)	21.27	19.98	1.047E-03	.0586	1.291E-03	.0723	1.235E-03	.0686	3.190E-03
T 9533(150)	22.73	21.43	1.011E-03	.0566	1.247E-03	.0698	1.183E-03	.0663	3.080E-03
S 3211(150)	22.73	21.43	1.011E-03	.0566	1.247E-03	.0698	1.183E-03	.0663	3.080E-03
M 5451(150)	22.73	21.43	1.011E-03	.0566	1.247E-03	.0698	1.183E-03	.0663	3.080E-03
T 9534(150)	24.75	23.44	9.659E-04	.0591	1.192E-03	.0647	1.131E-03	.0633	2.944E-03
S 3212(150)	24.75	23.44	9.659E-04	.0591	1.192E-03	.0647	1.131E-03	.0633	2.944E-03
M 5452(150)	24.75	23.44	9.659E-04	.0591	1.192E-03	.0647	1.131E-03	.0633	2.944E-03
T 9535(150)	26.78	25.49	9.267E-04	.0519	1.143E-03	.0640	1.085E-03	.0608	2.824E-03
S 3213(150)	26.78	25.49	9.267E-04	.0519	1.143E-03	.0640	1.085E-03	.0608	2.824E-03
M 5453(150)	26.78	25.49	9.267E-04	.0519	1.143E-03	.0640	1.085E-03	.0608	2.824E-03
T 9536(150)	28.81	27.52	8.919E-04	.0500	1.100E-03	.0616	1.044E-03	.0585	2.718E-03
S 3214(150)	28.81	27.52	8.919E-04	.0500	1.100E-03	.0616	1.044E-03	.0585	2.718E-03
M 5454(150)	28.81	27.52	8.919E-04	.0500	1.100E-03	.0616	1.044E-03	.0585	2.718E-03
T 9537(150)	30.84	29.54	8.608E-04	.0482	1.062E-03	.0595	1.008E-03	.0564	2.620E-03
S 3215(150)	30.84	29.54	8.608E-04	.0482	1.062E-03	.0595	1.008E-03	.0564	2.620E-03
M 5455(150)	30.84	29.54	8.608E-04	.0482	1.062E-03	.0595	1.008E-03	.0564	2.620E-03
T 9538(150)	32.84	31.55	8.330E-04	.0467	1.028E-03	.0576	9.750E-04	.0546	2.539E-03
S 3216(150)	32.84	31.55	8.330E-04	.0467	1.028E-03	.0576	9.750E-04	.0546	2.539E-03
M 5456(150)	32.84	31.55	8.330E-04	.0467	1.028E-03	.0576	9.750E-04	.0546	2.539E-03

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7/ 9/73

AFDC(AH-1) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL A

NASA-RI ORBITER PEAVING

VA299

GROUP	CONFID	MODEL	MACH NO	PO(PISA)	TO(DEC R)	ALPHA-MODEL	ALPHA-SECTOR	ALPHA-PREBEND	ROLL-MODEL	YAW
54	2	ORBITER S	7.91	110.6	1263	35.01	-5.02	-30.00	-181.80	1.03
T-1AF	P-1AF	Q-1AF	R-1AF	U-1AF	V-1AF	W-1AF	X-1AF	Y-1AF	Z-1AF	
(DEG R)	(PSIA)	(FT/SEC)	(SLUGS/FT <sup>3</sup> )	(LBS-SEC/FT <sup>2</sup> )	(FT-1)	(LBS-0.15E1)	(LBS-1.5E1)			
93.4	.012	.534	37.7	1.004E-05	7.527E-08	5.450E-05	1.785E-02	5.494E-02		
CAMERA	MULL NO	PAINT IFMP	(DEG F)	INITIAL TEMP	(DEG F)	SQUARE ROOT	(RHO/CCK)	TRAK(10)	BETA(10)	
TOP(1)	7375			79				9.813E-02	9.4328E-02	
SIDE(1)	8302									
MOTION(R)	7426									

PTC NO	TIME DELTIME	M(10)	M(10)/HREF	M(10)	M(10)/HREF	M(10)	M(10)/HREF	M(10)	M(10)/HREF	ST(10)
S 3214(150)	32.66	31.57	0.964	1.027E-03	0.0575	9.746E-04	0.0546	2.535E-03		
T 9439(150)	34.87	33.57	0.953	0.961E-04	0.0558	9.451E-04	0.0530	2.463E-03		
S 3215(150)	34.87	33.57	0.953	0.961E-04	0.0558	9.451E-04	0.0530	2.463E-03		
M 5457(150)	34.87	33.57	0.953	0.961E-04	0.0558	9.451E-04	0.0530	2.463E-03		
T 9440(150)	36.89	35.68	0.939	0.973E-04	0.0542	9.178E-04	0.0514	2.390E-03		
S 3216(150)	36.89	35.68	0.939	0.973E-04	0.0542	9.178E-04	0.0514	2.390E-03		
M 5458(150)	36.89	35.68	0.939	0.973E-04	0.0542	9.178E-04	0.0514	2.390E-03		
S 3217(150)	38.89	37.68	0.927	0.940E-04	0.0527	8.927E-04	0.0500	2.322E-03		
T 9441(150)	38.89	37.68	0.927	0.940E-04	0.0527	8.927E-04	0.0500	2.322E-03		
M 5459(150)	38.89	37.68	0.927	0.940E-04	0.0527	8.927E-04	0.0500	2.322E-03		
MODEL HAS LEFT CENTERLINE										
M 5460(150)	40.52	39.67	0.916	0.168E-04	0.0513	8.699E-04	0.0487	2.263E-03		
T 9442(150)	40.55	39.65	0.916	0.168E-04	0.0513	8.699E-04	0.0487	2.263E-03		
S 3218(150)	40.55	39.65	0.916	0.168E-04	0.0513	8.699E-04	0.0487	2.263E-03		
M 5461(150)	42.55	41.68	0.906	0.942E-04	0.0501	8.482E-04	0.0475	2.206E-03		
T 9443(150)	42.57	41.68	0.906	0.942E-04	0.0501	8.482E-04	0.0475	2.206E-03		
S 3219(150)	42.57	41.68	0.906	0.942E-04	0.0501	8.482E-04	0.0475	2.206E-03		

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Group 56  
7375  
ND

8601  
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 $\phi = 0^\circ$

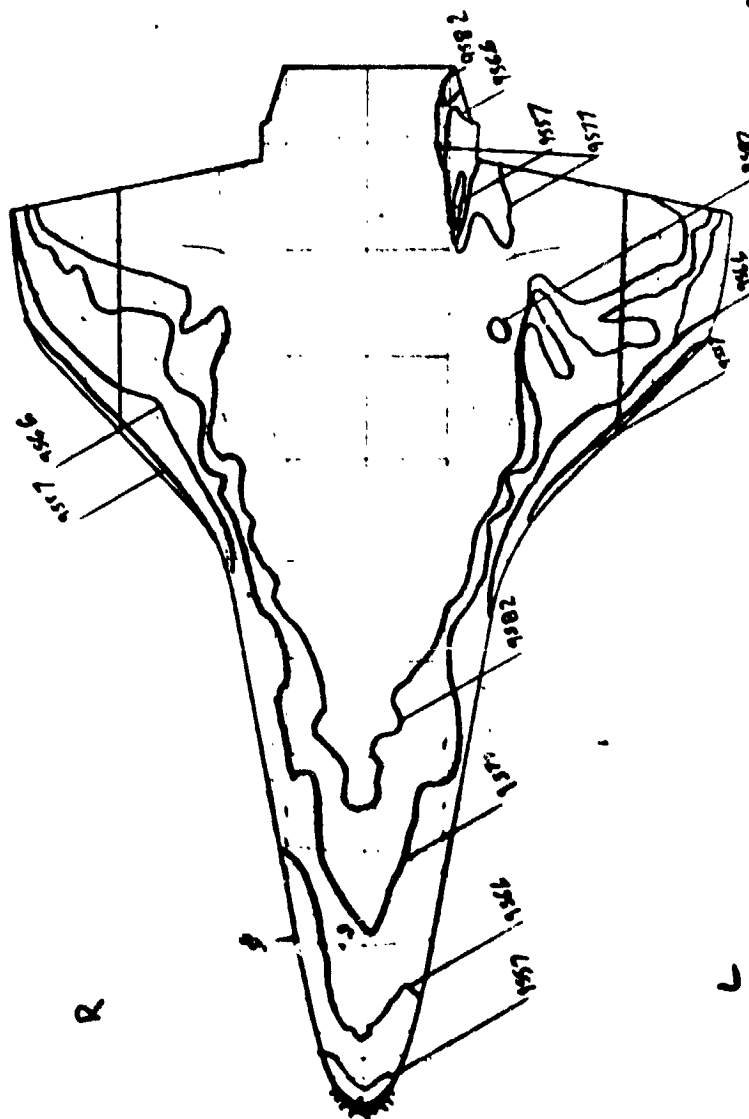


Figure 42



• UNCLASSIFIED •

**71 9173**

EDC(ARO,INC.) ARNOLD AFS, TENNESSEE  
VON KARMAN GAS DYNAMICS FACILITY  
50 INCH HYPERSONIC TUNNEL A

64299

GROUP	CONFIG	MODEL	MACM NO	PO(PSIA)	TO( DEG F)	ALPHA-A-MODEL	ALPHA-SECTION	ALPHA-PREBEND	ROLL-MODEL	YAW
56	2	ORBITER S	7.91	110.8	1264	44.83	-14.83	-30.00	-180.00	-0.00

T-INF	P-INF	Q-INF	V-INF	RMQ-INF	MU-INF	RE/FT	MREF	SREF
(DEG R)	(PSIA)	(EIT/SEC)	(SLMS/FT3)	(LB-SEC/FT2)	(FT-1)	(R2-0175FT)	(R2-0175FT)	(R2-0175FT)
93.6	.012	.535	374R	1.095E-05	7.529E-08	5.453E 05	1.747E-02	5.492E-02

ROLL NO	PAINT TEMP (DEG F)	INITIAL TEMP (DEG F)	SQUARE ROOT (MMOXCXK)	TRAR(TO)	BETA(TO)
7375					
8302	250	79	.0535	2.358E-01	2.5838E-
7426					

	PIC NO	TIME DELTIME	M(10)	MY(10)/MREF	M(10)	M(1000)/MREF	M(10000)/MREF	ST(10)
S	3235(250)	9.64	8.35	4.742E-03	.2577	6.108E-03	3.670	1.449E-02
M	5478(250)	10.66	9.39	4.513E-03	.2526	5.765E-03	.3044	1.367E-02
I	9580(250)	10.69	9.43	4.507E-03	.2522	5.757E-03	.2773	1.364E-02
S	3236(250)	10.69	9.41	4.707E-03	.2527	5.757E-03	.2773	1.364E-02
M	5481(250)	11.74	10.46	4.294E-03	.2392	5.408E-03	.272	1.294E-02
S	3237(250)	11.74	10.44	4.274E-03	.2392	5.408E-03	.2720	1.294E-02
M	5479(250)	11.74	10.46	4.274E-03	.2392	5.408E-03	.2720	1.294E-02
I	9582(250)	12.79	11.51	4.074E-03	.2279	5.205E-03	.2592	1.232E-02
S	3238(250)	12.79	11.51	4.074E-03	.2279	5.205E-03	.2592	1.232E-02
M	5480(250)	12.79	11.51	4.074E-03	.2279	5.205E-03	.2592	1.232E-02
I	9581(250)	13.84	12.54	3.906E-03	.2180	4.982E-03	.2480	1.179E-02
S	3239(250)	13.87	12.59	3.896E-03	.2180	4.977E-03	.2480	1.179E-02
M	5482(250)	13.87	12.59	3.896E-03	.2180	4.977E-03	.2480	1.179E-02
I	9583(250)	14.89	13.61	3.747E-03	.2095	4.784E-03	.2382	1.132E-02
S	3240(250)	14.92	13.64	3.743E-03	.2095	4.782E-03	.2382	1.132E-02
M	5483(250)	14.92	13.64	3.743E-03	.2095	4.782E-03	.2382	1.132E-02
I	9584(250)	15.97	14.69	3.607E-03	.2017	4.607E-03	.2294	1.091E-02
S	3241(250)	15.97	14.69	3.607E-03	.2017	4.607E-03	.2294	1.091E-02
M	5484(250)	15.97	14.69	3.607E-03	.2017	4.607E-03	.2294	1.091E-02
I	9585(250)	17.02	15.74	3.484E-03	.1948	4.451E-03	.2215	1.053E-02
S	3242(250)	17.02	15.74	3.484E-03	.1948	4.451E-03	.2215	1.053E-02
M	5485(250)	17.02	15.74	3.484E-03	.1948	4.451E-03	.2215	1.053E-02
I	9586(250)	18.10	16.82	3.371E-03	.1884	4.304E-03	.2142	1.018E-02
S	3243(250)	18.10	16.82	3.371E-03	.1884	4.304E-03	.2142	1.018E-02
M	5486(250)	18.10	16.82	3.371E-03	.1884	4.304E-03	.2142	1.018E-02
I	9587(250)	19.15	17.87	3.258E-03	.1820	4.182E-03	.2070	9.79E-03
S	3244(250)	19.15	17.87	3.258E-03	.1820	4.182E-03	.2070	9.79E-03
M	5487(250)	19.15	17.87	3.258E-03	.1820	4.182E-03	.2070	9.79E-03
I	9588(250)	20.20	18.92	3.145E-03	.1756	4.060E-03	.2000	9.44E-03
S	3245(250)	20.20	18.92	3.145E-03	.1756	4.060E-03	.2000	9.44E-03
M	5488(250)	20.20	18.92	3.145E-03	.1756	4.060E-03	.2000	9.44E-03
I	9589(250)	21.25	20.00	3.032E-03	.1692	3.938E-03	.1930	9.09E-03
S	3246(250)	21.25	20.00	3.032E-03	.1692	3.938E-03	.1930	9.09E-03
M	5489(250)	21.25	20.00	3.032E-03	.1692	3.938E-03	.1930	9.09E-03
I	9590(250)	22.30	21.05	2.919E-03	.1628	3.816E-03	.1860	8.74E-03
S	3247(250)	22.30	21.05	2.919E-03	.1628	3.816E-03	.1860	8.74E-03
M	5490(250)	22.30	21.05	2.919E-03	.1628	3.816E-03	.1860	8.74E-03
I	9591(250)	23.35	22.10	2.806E-03	.1564	3.694E-03	.1790	8.39E-03
S	3248(250)	23.35	22.10	2.806E-03	.1564	3.694E-03	.1790	8.39E-0

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# NASA-RI ORBITER PEATING

VA289

AEDC(ARO, INC.) ARNOLD AFS, TENNESSEE  
VON KARMAN GAS DYNAMICS FACILITY  
50 INCH HYPERSONIC TUNNEL R

GROUP COMP16 MODEL MACH NO PR(PSTA) TO(IDEG R) ALPHA-MODEL ALPHA-SECTION ALPHA-PREBEND ROLL-MODEL YAW  
56 2 ORBITER S 7.91 111.1 1264 44.83 -14.83 -30.00 -180.00 -0.00

T-INF P-INF Q-INF V-INF MU-INF RE/FT MREF STREF  
(OFG R) (PSTA) (PSTA) (FT/SEC) (SLUGS/FT) (LB-SEC/FT) (FT-1) (R-0175E1) (R-0175E1)  
93.5 .012 .536 374 1.00E-05 7.530E-08 5.466E 05 1.749E-02 5.485E-02

CAMERA MOLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHOCAK) TRAR(TO) BETA(TO)  
TOP(T) 7375 79 .0535 2.356E-01 2.5838E-01  
SIDE(S) 8302  
MOTCHIR 7425

PTC NO	TIME DELT	H(TO)	HREF	H(-910)	H(-910)/HREF	H(-9410)	H(-9410)/HREF	ST(TO)
T 9564(250)	19.15	17.87	1.27	4.174E-03	.2335	3.719E-03	.2078	9.871E-03
S 3244(250)	19.15	17.87	1.27	4.174E-03	.2335	3.719E-03	.2078	9.871E-03
M 5436(250)	19.15	17.87	1.27	4.174E-03	.2335	3.719E-03	.2078	9.871E-03
T 9569(250)	20.20	18.92	1.775	4.000E-03	.2248	3.614E-03	.2019	9.585E-03
M 5441(250)	20.20	18.92	1.775	4.000E-03	.2248	3.614E-03	.2019	9.585E-03
S 3245(250)	20.22	18.94	1.775	4.057E-03	.2267	3.612E-03	.2018	9.587E-03
M 5448(250)	21.25	19.97	1.728	3.952E-03	.2207	3.518E-03	.1965	9.329E-03
T 9570(250)	21.27	20.01	1.727	3.949E-03	.2207	3.518E-03	.1965	9.332E-03
S 3246(250)	21.27	20.01	1.727	3.949E-03	.2207	3.518E-03	.1965	9.332E-03
T 9571(250)	22.33	21.05	1.684	3.849E-03	.2151	3.427E-03	.1915	9.096E-03
S 3247(250)	22.33	21.05	1.684	3.849E-03	.2151	3.427E-03	.1915	9.096E-03
M 5449(250)	22.33	21.05	1.684	3.849E-03	.2151	3.427E-03	.1915	9.096E-03
T 9572(250)	23.38	22.10	1.642	3.757E-03	.2098	3.344E-03	.1868	8.869E-03
S 3248(250)	23.38	22.10	1.642	3.757E-03	.2098	3.344E-03	.1868	8.869E-03
M 5450(250)	23.38	22.10	1.642	3.757E-03	.2098	3.344E-03	.1868	8.869E-03
T 9573(250)	24.43	23.15	1.604	3.670E-03	.2049	3.264E-03	.1824	8.658E-03
M 5451(250)	24.43	23.15	1.604	3.670E-03	.2049	3.264E-03	.1824	8.658E-03
S 3249(250)	24.45	23.17	1.605	3.669E-03	.2050	3.264E-03	.1825	8.668E-03
M 5452(250)	25.48	24.20	1.567	3.590E-03	.2001	3.194E-03	.1782	8.445E-03
T 9574(250)	25.50	24.23	1.569	3.588E-03	.2004	3.194E-03	.1784	8.470E-03
S 3250(250)	25.50	24.23	1.569	3.588E-03	.2004	3.194E-03	.1784	8.470E-03
T 9575(250)	26.56	25.28	1.536	3.512E-03	.1962	3.127E-03	.1747	8.292E-03
S 3251(250)	26.56	25.28	1.536	3.512E-03	.1962	3.127E-03	.1747	8.292E-03
M 5453(250)	26.56	25.28	1.536	3.512E-03	.1962	3.127E-03	.1747	8.292E-03
T 9576(250)	27.61	26.33	1.505	3.442E-03	.1922	3.064E-03	.1711	8.125E-03
M 5454(250)	27.61	26.33	1.505	3.442E-03	.1922	3.064E-03	.1711	8.125E-03

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NASA-RI ORBITER PEATING  
AEDC(ARD, INC.) ARNOLD AFS, TENNESSEE  
VON KARMAN GAS DYNAMICS FACILITY  
50 INCH HYPERSONIC TUNNEL R

VA299

GROUP CONFID MODEL MACH NO PO(PSIA) TO(IDEG F) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREBEND ROLL-MODEL YAW  
56 2 ORBITER S 7.91 111.1 1264 44.83 -14.83 -30.00 -180.00 -0.00

T-INF P-INF Q-INF RMO-INF MU-INF RF/FT HREF STREF  
(DEG H) (PSIA) (EI/SEC) (SLUGS/EI3) (LB-SEC/EI2) (ET-1) (R-0175E1) (R-0175E1)  
93.5 .012 .537 3748 1.099E-05 7.530E-08 5.471E 05 1.790E-02 5.483E-02

CAMERA HOLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SOURCE ROOT (RHOXCRK) TBAR(TO) BETA(TO)  
TOP(T) 7275  
SIDE(S) 8302 250 79 .0535 2.358E-01 2.5838E-01  
MOLICH(L) 7424

PIC NO	TIME DELTIME	H(TO)	M(TO)/HREF	M(-9TO)	M(-9TO)/HREF	M(-944TO)	M(-944TO)/HREF	ST(TO)
S 3252(250)	27.63	2.643E-03	.1903	3.440E-03	.1920	3.062E-03	.1709	0.107E-03
T 9577(250)	28.46	2.642E-03	.1475	3.375E-03	.1884	3.005E-03	.1477	7.961E-03
M 5495(250)	28.44	2.642E-03	.1475	3.375E-03	.1884	3.005E-03	.1477	7.961E-03
S 3253(250)	28.68	2.641E-03	.1474	3.373E-03	.1883	3.003E-03	.1477	7.957E-03
M 5496(250)	29.71	2.643	.1447	3.312E-03	.1849	2.948E-03	.1646	7.813E-03
T 9578(250)	29.73	2.646	.1446	3.310E-03	.1847	2.947E-03	.1645	7.802E-03
S 3254(250)	29.73	2.646	.1446	3.310E-03	.1847	2.947E-03	.1645	7.802E-03
T 9579(250)	31.61	30.33	.1401	3.206E-03	.1789	2.855E-03	.1593	7.557E-03
S 3255(250)	31.61	30.33	.1401	3.206E-03	.1789	2.855E-03	.1593	7.557E-03
M 5497(250)	31.61	30.33	.1401	3.206E-03	.1789	2.855E-03	.1593	7.557E-03
T 9580(250)	33.64	32.34	.1356	3.104E-03	.1732	2.764E-03	.1542	7.316E-03
S 3256(250)	33.64	32.34	.1356	3.104E-03	.1732	2.764E-03	.1542	7.316E-03
M 5498(250)	33.64	32.34	.1356	3.104E-03	.1732	2.764E-03	.1542	7.316E-03
T 9581(250)	35.67	34.39	.1315	3.011E-03	.1680	2.681E-03	.1495	7.091E-03
S 3257(250)	35.67	34.39	.1315	3.011E-03	.1680	2.681E-03	.1495	7.091E-03
M 5499(250)	35.67	34.39	.1315	3.011E-03	.1680	2.681E-03	.1495	7.091E-03
T 9582(250)	37.69	36.41	.1278	2.926E-03	.1633	2.605E-03	.1454	6.897E-03
S 3258(250)	37.69	36.41	.1278	2.926E-03	.1633	2.605E-03	.1454	6.897E-03
M 5500(250)	37.69	36.41	.1278	2.926E-03	.1633	2.605E-03	.1454	6.897E-03
MODEL HAS LEFT CENTERLINE								
T 3593(250)	39.72	38.44	.1244	2.849E-03	.1589	2.536E-03	.1414	6.706E-03
S 3259(250)	39.72	38.44	.1244	2.849E-03	.1589	2.536E-03	.1414	6.706E-03
M 5501(250)	39.72	38.44	.1244	2.849E-03	.1589	2.536E-03	.1414	6.706E-03

235

393

Group 57  
8802  
105

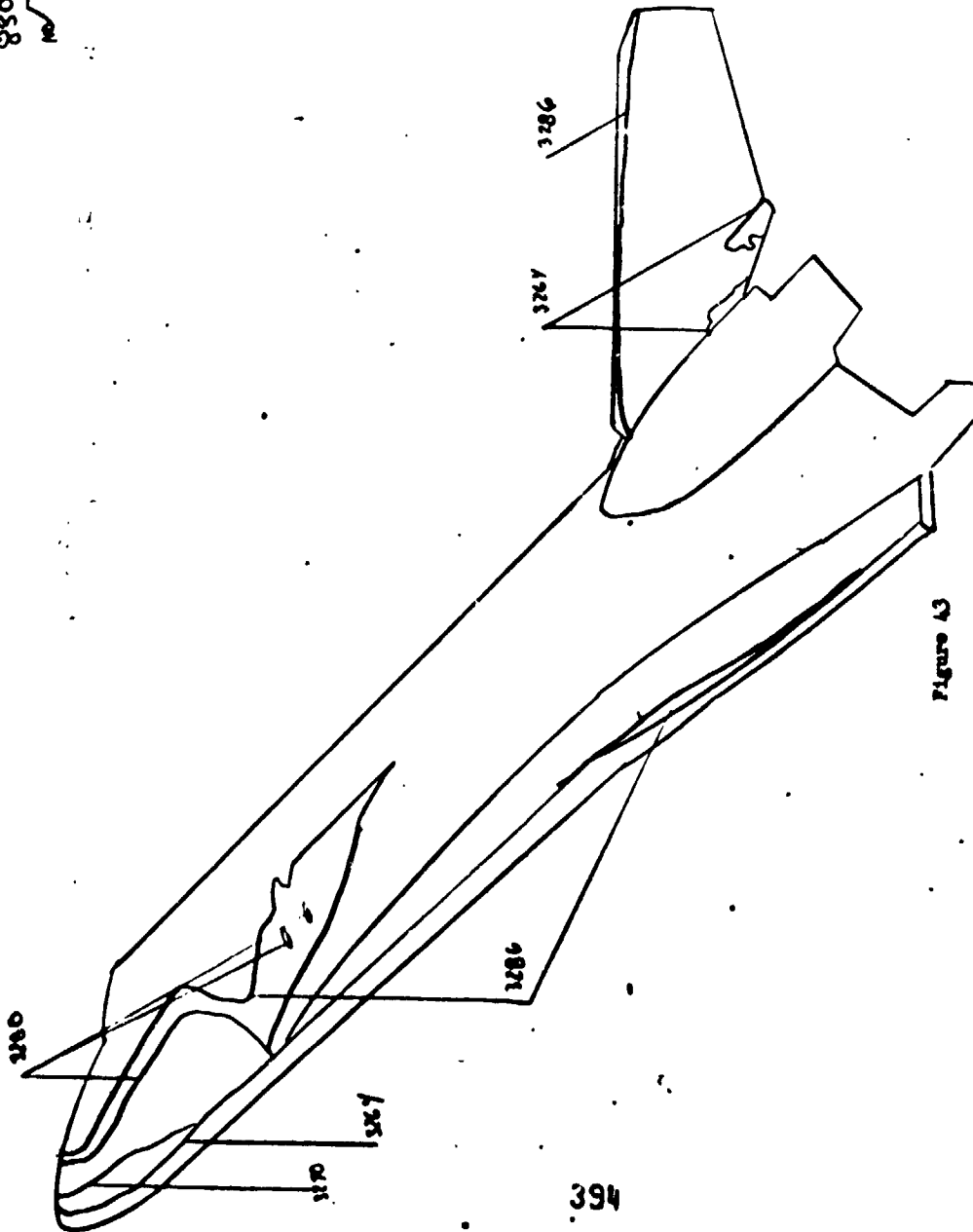


Figure 13

Group 57  
7426  
JW

$\alpha \sim 45^\circ$   
 $\phi = 50$

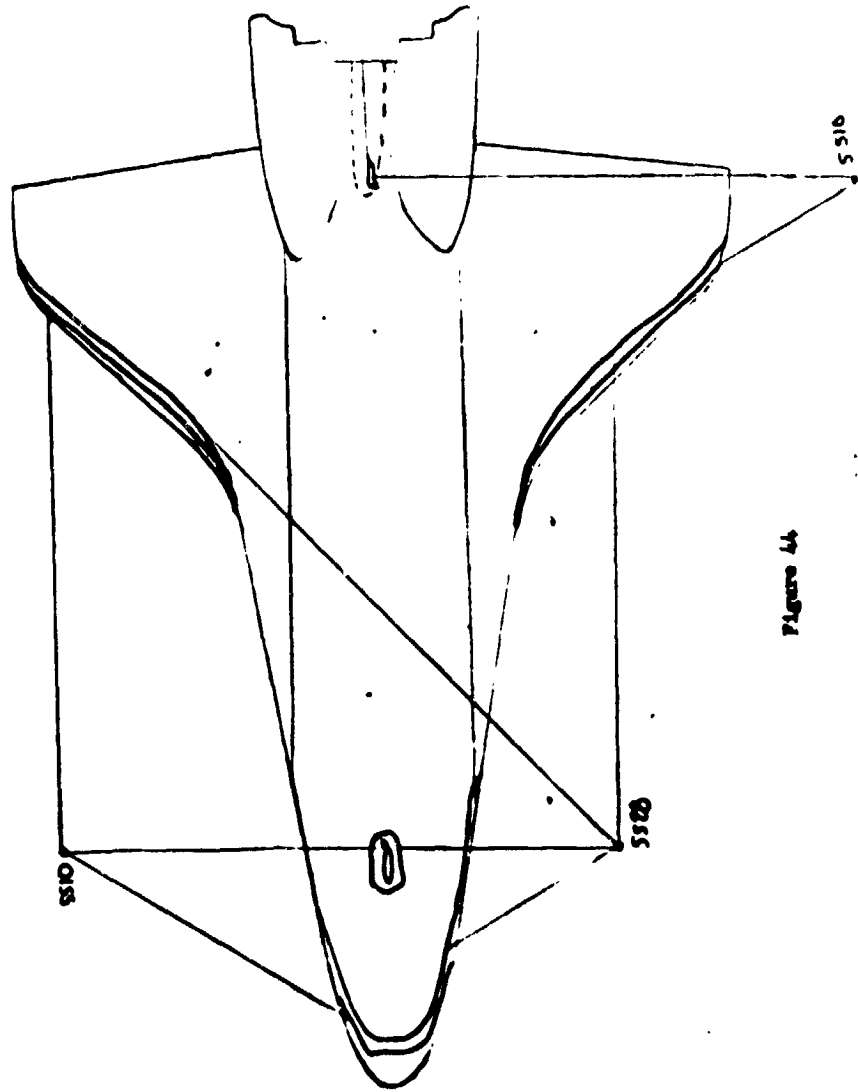


Figure 44





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AEDC(AMN) INC. AMNOLU AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL 4

NASA-RT ORBITER PEATING

VA204

GROUP C/MPT6 MODEL MACH NO PR(PSTA) TO(DEC B) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREBEND ROLL-MODEL YAW  
 57 2 ORBITER S 7.91 110.3 1265 44.84 -14.84 -30.80 -100.00 -0.00

T-1NF P-1NF Q-1NF V-1NF MU-INF RE/FT HREF STREF  
 (DEG B) (PSIA) (PSIA) (PSIA) (LBS/SEC/FT) (LBS/SEC/FT) (FT-1) (R= .0175FT) (R= .0175FT)

93.6 .012 .532 3750 1.000E-04 7.535E-08 5.022E 05 1.743E-02 5.507E-02

CAMERA ROLL NO PAINT (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (MMO/SEC) T8AR(10) BETA(10)  
 TOP(1) 7275 113 80 4.554E-02 4.1857E-02  
 BOTTOM(1) 7426

PIC NO	TIME	MELTIME	H(10)	M(10)/MREF	M(10)	M(10)/MREF	M(10)	M(10)/MREF	M(10)	M(10)/MREF	ST(10)
S 1204(111)	9.66	8.37	4.873E-04	.0344	4.349E-04	.0371	7.843E-04	.0429	2.108E-03		
M 5511(111)	10.69	9.30	4.407E-04	.0364	7.923E-04	.0444	7.214E-04	.0405	1.907E-03		
T 0403(111)	10.71	9.42	4.478E-04	.0363	7.913E-04	.0444	7.204E-04	.0404	1.907E-03		
S 1205(111)	10.71	8.52	4.478E-04	.0363	7.913E-04	.0444	7.204E-04	.0404	1.907E-03		
T 0404(111)	11.76	10.47	4.144E-04	.0345	7.505E-04	.0421	6.833E-04	.0383	1.893E-03		
S 3270(111)	11.76	10.47	4.144E-04	.0345	7.505E-04	.0421	6.833E-04	.0383	1.893E-03		
M 5512(111)	11.76	10.47	4.144E-04	.0345	7.505E-04	.0421	6.833E-04	.0383	1.893E-03		
S 3271(111)	12.01	11.52	4.857E-04	.0328	7.154E-04	.0401	6.514E-04	.0365	1.793E-03		
T 0405(111)	12.01	11.52	4.857E-04	.0328	7.154E-04	.0401	6.514E-04	.0365	1.793E-03		
M 5513(111)	12.01	11.52	4.857E-04	.0328	7.154E-04	.0401	6.514E-04	.0365	1.793E-03		
S 3272(111)	13.67	12.57	4.607E-04	.0314	6.942E-04	.0384	6.234E-04	.0349	1.715E-03		
T 0406(111)	13.69	12.66	4.607E-04	.0314	6.942E-04	.0384	6.234E-04	.0349	1.715E-03		
M 5514(111)	13.69	12.66	4.607E-04	.0314	6.942E-04	.0384	6.234E-04	.0349	1.715E-03		
S 3273(111)	14.54	13.45	4.341E-04	.0302	6.573E-04	.0368	5.985E-04	.0335	1.647E-03		
T 0407(111)	14.54	13.45	4.341E-04	.0302	6.573E-04	.0368	5.985E-04	.0335	1.647E-03		
M 5515(111)	14.54	13.45	4.341E-04	.0302	6.573E-04	.0368	5.985E-04	.0335	1.647E-03		
S 3274(111)	15.59	14.74	4.145E-04	.0291	6.334E-04	.0355	5.767E-04	.0323	1.587E-03		
T 0408(111)	15.59	14.74	4.145E-04	.0291	6.334E-04	.0355	5.767E-04	.0323	1.587E-03		
M 5516(111)	16.02	14.77	4.145E-04	.0290	6.329E-04	.0355	5.762E-04	.0323	1.585E-03		
S 3275(111)	17.04	15.75	4.009E-04	.0281	6.119E-04	.0343	5.571E-04	.0312	1.532E-03		
T 0409(111)	17.04	15.75	4.009E-04	.0281	6.119E-04	.0343	5.571E-04	.0312	1.532E-03		
M 5517(111)	17.04	15.75	4.009E-04	.0281	6.119E-04	.0343	5.571E-04	.0312	1.532E-03		
S 3276(111)	18.12	16.47	4.847E-04	.0271	5.920E-04	.0332	5.390E-04	.0302	1.481E-03		
T 0410(111)	18.12	16.47	4.847E-04	.0271	5.920E-04	.0332	5.390E-04	.0302	1.481E-03		
M 5518(111)	18.12	16.47	4.847E-04	.0271	5.920E-04	.0332	5.390E-04	.0302	1.481E-03		

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MASA-RI ORBITER PEATING

AEDC(ARO, INC.) ARNOLD AFS, TENNESSEE

VOM KARMAN GAS DYNAMICS FACILITY

50 INCH HYPERSONIC TUNNEL A

VA249

GROUP COMPTE MODEL MACH NO PH(PISA) IN(DEC R) ALPHA-MODEL ALPHA-SECTION ALPHA-PREHMO ROLL-MODEL YAW

57 2 GREITER S 7.01 110.6 1265 42.84 -14.04 -30.00 -180.00 -0.03

T-1AF P-1NF Q-1NF V-1NF RMO-1NF MU-1NF OF/FI MREF STREF

(DEC R) (PISA) (PSIA) (FT/SEC) (SLUGS/FT) (LBS-SEC/FT) (FT-1) (R-0175E1) (H-0175E1)

01.6 012 576 3750 1.02E-04 7.53E-04 5.43E 05 1.76E-02 5.50E-02

CAMERA ROLL NO PAINT (DEC F) INITIAL TEMP (DEC F) SQUARE ROOT (MMO/CXK) YBAR(TO) RETA(TO)

TOP(T) 7275

NIDF(S) 8302

MOITRM(Q) 7426

113

0.075

4.554E-02

4.1857E-02

0.075

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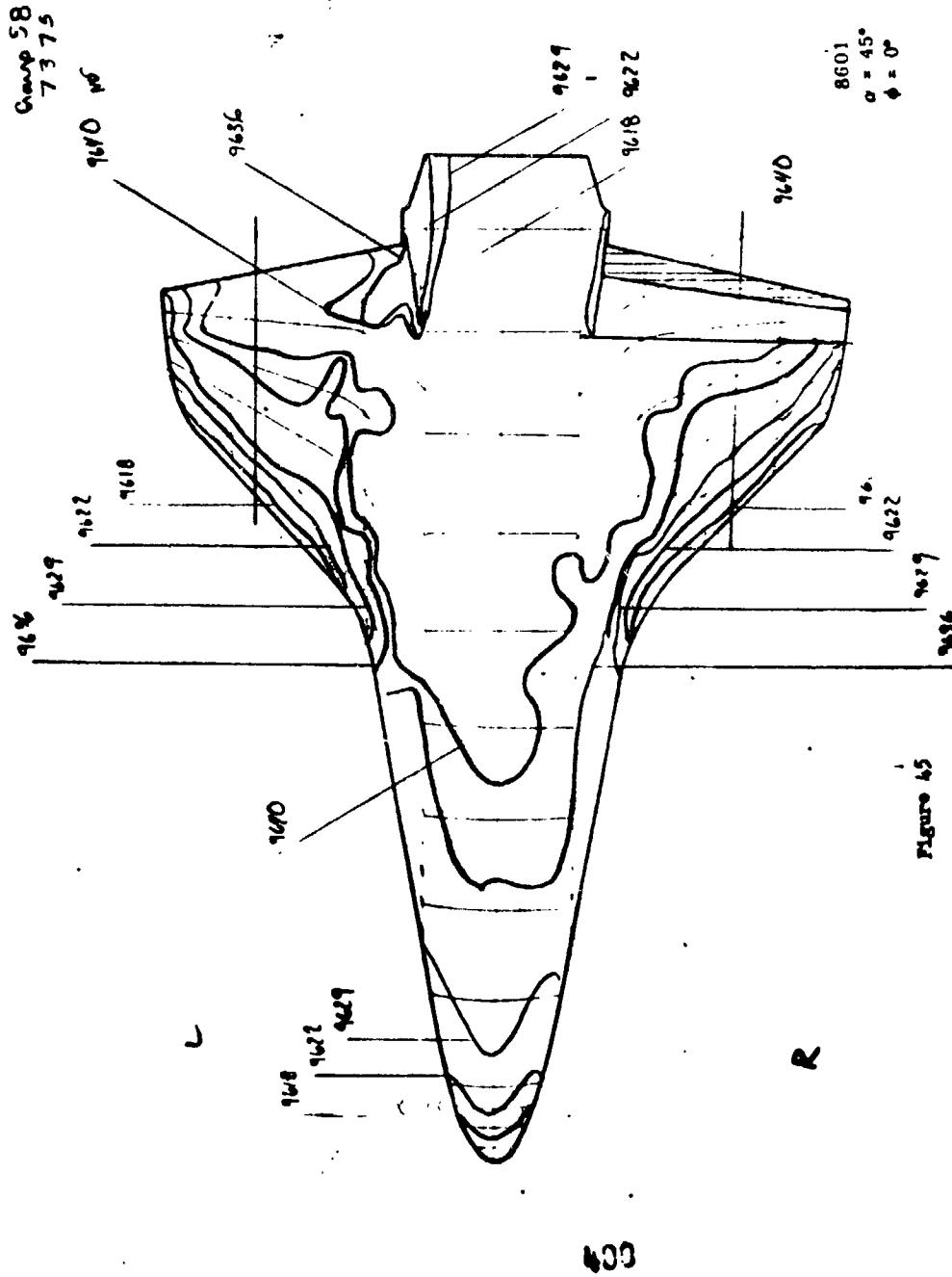
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AEC(AMO-INC.) ARNOLD AFS, TENNESSEE  
VON KAMMEN GAS DYNAMICS FACILITY  
50 INCH HYPERSONIC TUNNEL

	P-1NF	P-2NF	P-3NF	G-1NF	(F1/SEC)	SUNGS/FI3)	RNO=INF	MU=INF	HF/FI	MREF	STAF
069.8)				(P51A)	(P51B)			(LM=SEC/FI2)	(FI-1)	(R=-.0175Y)	(M=-.0175FY)
03.4		.912	.536	3750	1.407E+25	7.530E+04	5.460E 04	1.700E-02	5.460E-02		

PIC NO	TIME	RELTIME	M(TO)	M(TO)/MREF	M(.9TO)	M(.9TO)/MREF	M(.944TO)	M(.944TO)/MREF	ST(TO)
32052(113)	33.10	31.00	7.529F-04	.0197	4.308E-04	.0240	3.915E-04	.0219	1.072E-03
32052(113)	35.10	33.00	7.015E-04	.0191	4.171E-04	.0233	3.798E-04	.0212	1.037E-03
04181(113)	35.22	33.92	7.515E-04	.0191	4.170E-04	.0233	3.796E-04	.0212	1.038E-03
32046(113)	35.32	33.92	7.614E-04	.0191	4.171E-04	.0233	3.796E-04	.0212	1.038E-03
MODEL HAS LEFT CENTRAL LINE									
04111(113)	37.07	35.95	7.3316F-04	.0195	4.050E-04	.0226	3.688E-04	.0206	1.008E-03
32037(113)	37.24	35.95	7.3316E-04	.0195	4.050E-04	.0226	3.688E-04	.0206	1.008E-03
55241(113)	37.24	35.95	7.3316E-04	.0195	4.050E-04	.0226	3.688E-04	.0206	1.008E-03



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NASA-R1 ORBITER HEATING  
 VA299  
 AEDCIARD, INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL R

GROUP COMF16 MODEL MACH NO POIP(SIA) TO(DEG H) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREBEND ROLL-MODEL YAW  
 5A 3 ORBITER E 7.91 109.6 1265 44.84 -14.84 -30.00 -180.00 -0.00

T-INF P-INF Q-INF V-INF RINF-INF MU-INF RE/FT MREF STREF  
 (DEG R) (PSIA) (PSIA) (FI/SEC) (SLUGS/FI3) (LB-SEC/FI3) (FI-1) (R= .0175EI) (R= .0175EI)  
 93.6 .012 .529 3751 1.022F-05 7.539E-08 5.383E 05 1.778E-02 5.527E-02

CAMERA ROLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (HMOACAK) TBAR(10) BETA(10)  
 TOP(1) 7375 78  
 STRE(1) 8302  
 BOTTOM(1) 7426 .0528 0 0

PIC NO TIME DELTIME M(TO) MREF M(-910) M(-910)/MREF M(-944TO) M(-944TO)/MREF ST(10)  
 T 9412(225) 1.18 MCJCL HAS NOT REACHED CENTERLINE  
 S 3248(225) 1.18 MODEL HAS NOT REACHED CENTERLINE  
 M 5530(225) 1.18 MODEL HAS NOT REACHED CENTERLINE  
 W 531(225) 2.23 MODEL HAS NOT REACHED CENTERLINE  
 T 9413(225) 2.25 MODEL HAS NOT REACHED CENTERLINE  
 S 3249(225) 2.25 MODEL HAS NOT REACHED CENTERLINE  
 INJECT TIME = 2.30

T 9414(225) 3.30 DATA NOT YET VALID  
 S 3250(225) 3.30 DATA NOT YET VALID

M 5532(225) 3.30 6.453F-03 .1426 R.158E-03 .4595 7.302E-03 .4104 1.975E-02  
 S 3291(225) 4.36 3.04 6.453F-03 .3624 R.158E-03 .4595 7.302E-03 .4104 1.975E-02  
 M 5533(225) 4.36 3.04 6.453F-03 .3624 R.158E-03 .4595 7.302E-03 .4104 1.975E-02  
 T 9415(225) 4.38 3.09 6.453F-03 .3624 R.158E-03 .4595 7.302E-03 .4104 1.975E-02  
 S 3292(225) 5.41 4.11 5.564F-03 .3129 7.039E-03 .3956 6.300E-03 .3541 1.704E-02  
 M 5534(225) 5.41 4.11 5.564F-03 .3129 7.039E-03 .3956 6.300E-03 .3541 1.704E-02  
 S 3293(225) 5.43 4.14 5.551F-03 .3121 7.018E-03 .3946 6.281E-03 .3532 1.700E-02  
 T 9417(225) 6.48 5.19 4.957F-03 .2784 6.267E-03 .3920 5.609E-03 .3151 1.516E-02  
 S 3294(225) 6.48 5.19 4.957F-03 .2784 6.267E-03 .3920 5.609E-03 .3151 1.516E-02  
 M 5535(225) 6.48 5.19 4.957F-03 .2784 6.267E-03 .3920 5.609E-03 .3151 1.516E-02  
 T 9418(225) 7.53 6.24 4.520E-03 .2540 5.715E-03 .3212 5.115E-03 .2875 1.383E-02  
 S 3295(225) 7.53 6.24 4.520E-03 .2540 5.715E-03 .3212 5.115E-03 .2875 1.383E-02  
 T 9419(225) 7.56 6.27 4.511F-03 .2535 5.703E-03 .3205 5.105E-03 .2869 1.380E-02  
 S 3296(225) 8.58 7.29 4.142E-03 .2348 5.287E-03 .2969 4.732E-03 .2657 1.277E-02  
 M 5536(225) 8.58 7.29 4.142E-03 .2348 5.287E-03 .2969 4.732E-03 .2657 1.277E-02  
 T 9420(225) 8.61 7.32 4.174E-03 .2144 5.274E-03 .2946 4.724E-03 .2655 1.277E-02  
 S 3297(225) 9.66 8.37 3.903F-03 .2193 4.935E-03 .2772 4.417E-03 .2481 1.193E-02  
 M 5537(225) 9.66 8.37 3.903F-03 .2193 4.935E-03 .2772 4.417E-03 .2481 1.193E-02  
 S 3298(225) 9.66 8.37 3.903F-03 .2193 4.935E-03 .2772 4.417E-03 .2481 1.193E-02

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AEDCI(ARO-INC.) JMWOL AFS, TENNESSEE  
VON KARMAN GAS DYNAMICS FACILITY  
50 INCH HYPERSONIC TUNNEL #

NASA-R1 ORBITER HEATING  
VA28

GROUP COMFIE MODEL MACH NO P(P(SIA) T(IDEG R) ALPHA-MODEL ALPHA-SECTION ALPHA-PREBEND ROLL-MODEL YAW  
# 3 ORBITER E 7.91 109.9 1265 4.84 -14.84 -30.00 -180.00 -0.00

T-INF Q-INF V-INF MU-INF RE/FT HREF STREF  
IDF5 R (PSIA) (PSIA) (FI/SEC) (SLUGS/FI3) (LR-SEC/FI2) (FI-1) (R= .0175FI) (R= .0175FI)

93.6 .012 .530 3751 1.085E-05 7.534E-09 5.397E-05 1.780E-02 5.519E-02

CAMERA ROLL NO PAINT IFMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHOXAK) TRAHI(TO) RETA(TO)  
TOP(T) 7375 78 .0528 2.020E-01 2.1386E-01  
SIDE(S) 8302  
BOTTOM(B) 7426

WTC NO	TIME	NETTIME	H(TO)/HREF	H(-910)	M(-910)/HREF	M(-944TO)	M(-944TO)/HREF	ST(TO)
T 9421(225)	10.71	9.42	3.679E-03	4.652E-03	.2614	4.163E-03	.2340	1.126E-02
M 5539(225)	10.71	9.42	3.679E-03	4.652E-03	.2614	4.163E-03	.2340	1.126E-02
S 3297(225)	10.74	9.44	3.674E-03	4.646E-03	.2608	4.158E-03	.2335	1.122E-02
M 5540(225)	11.76	10.47	3.440E-03	4.412E-03	.2478	3.949E-03	.2218	1.067E-02
T 9422(225)	11.79	10.50	3.445E-03	4.417E-03	.2474	3.944E-03	.2215	1.065E-02
M 5541(225)	11.79	10.50	3.445E-03	4.417E-03	.2474	3.944E-03	.2215	1.065E-02
S 3298(225)	12.64	11.56	3.323E-03	4.291E-03	.2358	3.760E-03	.2110	1.014E-02
T 9423(225)	12.64	11.56	3.323E-03	4.291E-03	.2358	3.760E-03	.2110	1.014E-02
M 5542(225)	12.64	11.56	3.323E-03	4.291E-03	.2358	3.760E-03	.2110	1.014E-02
S 3300(225)	13.69	12.60	3.141E-03	4.022E-03	.2257	3.600E-03	.2020	9.709E-03
T 9424(225)	13.69	12.60	3.141E-03	4.022E-03	.2257	3.600E-03	.2020	9.709E-03
M 5543(225)	13.69	12.60	3.141E-03	4.022E-03	.2257	3.600E-03	.2020	9.709E-03
S 3301(225)	14.57	13.67	3.054E-03	3.861E-03	.2147	3.456E-03	.1939	9.319E-03
T 9425(225)	14.57	13.67	3.054E-03	3.861E-03	.2147	3.456E-03	.1939	9.319E-03
M 5544(225)	14.57	13.67	3.054E-03	3.861E-03	.2147	3.456E-03	.1939	9.319E-03
S 3302(225)	16.02	14.73	2.943E-03	3.720E-03	.2088	3.330E-03	.1869	8.981E-03
T 9426(225)	16.02	14.73	2.943E-03	3.720E-03	.2088	3.330E-03	.1869	8.981E-03
M 5545(225)	16.02	14.73	2.943E-03	3.720E-03	.2088	3.330E-03	.1869	8.981E-03
S 3303(225)	17.07	15.78	2.843E-03	3.594E-03	.2015	3.217E-03	.1804	8.661E-03
T 9427(225)	17.09	15.80	2.841E-03	3.592E-03	.2016	3.215E-03	.1804	8.669E-03
M 5546(225)	17.09	15.80	2.841E-03	3.592E-03	.2016	3.215E-03	.1804	8.669E-03
S 3304(225)	18.15	16.86	2.751E-03	3.478E-03	.1952	3.113E-03	.1747	8.394E-03
T 9428(225)	18.15	16.86	2.751E-03	3.478E-03	.1952	3.113E-03	.1747	8.394E-03
M 5547(225)	18.15	16.86	2.751E-03	3.478E-03	.1952	3.113E-03	.1747	8.394E-03
S 3305(225)	19.20	17.90	2.669E-03	3.374E-03	.1893	3.020E-03	.1694	8.137E-03
T 9429(225)	19.20	17.90	2.669E-03	3.374E-03	.1893	3.020E-03	.1694	8.137E-03
M 5548(225)	19.20	17.90	2.669E-03	3.374E-03	.1893	3.020E-03	.1694	8.137E-03

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7/ 9/73

NASA-RI ORBITER HEATING  
 VA289

AEDCIANO, INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL R

GROUP CONFID MODEL MACH NO PO(PSTIA) TO(DEG R) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREBEND ROLL-MODEL YAW  
 SR 3 ORBITER E 7.91 110.2 1266 44.84 -14.84 -30.00 -100.00 -0.00

T-INF P-INF U-INF V-INF RMO-INF MU-INF HE/FT HREF STREF  
 (DEG R) (PSIA) (PSIA) (FT/SEC) (SLUGS/FT<sup>2</sup>) (FT-L) (RZ-.0175E1) (RZ-.0175E1)  
 93.7 .012 .532 3751 1.000E-05 7.540E-04 5.411E 05 1.743E-02 5.512E-02

CAMERA POLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHO/CK) TRAR(ITO) BETA(ITO)  
 TOP(1) 7375  
 SIDE(S) R302 225 70 .0524 2.020E-01 2.1306E-01  
 MOLLICM(B) 7426

PIC NO	TIME	DELTIME	HITOT	HITOT/MREF	M(.910)	M(.910)/MREF	M(.944TO)	M(.944TO)/MREF	ST(ITO)
S 3305(1225)	19.22	17.97	2.667E-03	.1495	3.372E-03	.1991	3.010E-03	.1492	8.125E-03
T 9430(1225)	20.27	18.00	2.542E-03	.1453	3.277E-03	.1937	2.933E-03	.1644	7.889E-03
S 3306(1225)	20.27	18.00	2.542E-03	.1453	3.277E-03	.1937	2.933E-03	.1644	7.889E-03
M 5544(1225)	20.27	18.00	2.542E-03	.1453	3.277E-03	.1937	2.933E-03	.1644	7.889E-03
T 9431(1225)	21.32	20.03	2.523E-03	.1414	3.190E-03	.1748	2.855E-03	.1600	7.679E-03
S 3307(1225)	21.32	20.03	2.523E-03	.1414	3.190E-03	.1748	2.855E-03	.1600	7.679E-03
M 5545(1225)	21.32	20.03	2.523E-03	.1414	3.190E-03	.1748	2.855E-03	.1600	7.679E-03
T 9432(1225)	22.38	21.04	2.459E-03	.1379	3.109E-03	.1743	2.783E-03	.1560	7.486E-03
M 5550(1225)	22.38	21.04	2.459E-03	.1379	3.109E-03	.1743	2.783E-03	.1560	7.486E-03
S 3308(1225)	22.40	21.11	2.448E-03	.1374	3.107E-03	.1742	2.781E-03	.1560	7.487E-03
T 9433(1225)	23.45	22.14	2.349E-03	.1345	3.033E-03	.1701	2.715E-03	.1522	7.308E-03
S 3309(1225)	23.45	22.14	2.349E-03	.1345	3.033E-03	.1701	2.715E-03	.1522	7.308E-03
M 5551(1225)	23.45	22.14	2.349E-03	.1345	3.033E-03	.1701	2.715E-03	.1522	7.308E-03
T 9434(1225)	25.08	23.79	2.315E-03	.1297	2.927E-03	.1640	2.620E-03	.1468	7.041E-03
M 5552(1225)	25.08	23.79	2.315E-03	.1297	2.927E-03	.1640	2.620E-03	.1468	7.041E-03
S 3310(1225)	25.10	23.81	2.314E-03	.1297	2.924E-03	.1640	2.619E-03	.1468	7.044E-03
M 5553(1225)	25.11	23.81	2.223E-03	.1264	2.810E-03	.1573	2.515E-03	.1408	6.753E-03
T 9435(1225)	27.13	25.84	2.221E-03	.1265	2.819E-03	.1574	2.514E-03	.1409	6.761E-03
S 3311(1225)	27.13	25.84	2.221E-03	.1265	2.809E-03	.1574	2.514E-03	.1409	6.761E-03
M 5554(1225)	27.16	27.87	2.139E-03	.1198	2.705E-03	.1514	2.421E-03	.1355	6.499E-03
S 3312(1225)	29.16	27.87	2.139E-03	.1198	2.705E-03	.1514	2.421E-03	.1355	6.499E-03
M 5555(1225)	29.16	27.87	2.054E-03	.1157	2.611E-03	.1463	2.337E-03	.1309	6.281E-03
T 9437(1225)	31.19	29.89	2.054E-03	.1157	2.611E-03	.1463	2.337E-03	.1309	6.281E-03
S 3313(1225)	31.19	29.89	2.054E-03	.1157	2.611E-03	.1463	2.337E-03	.1309	6.281E-03
M 5556(1225)	31.19	29.89	2.054E-03	.1157	2.611E-03	.1463	2.337E-03	.1309	6.281E-03

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7/ 9/73

MASA-RI ORBITER FEATINE

VA2A9

AEDC(ARO+IAC) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL A

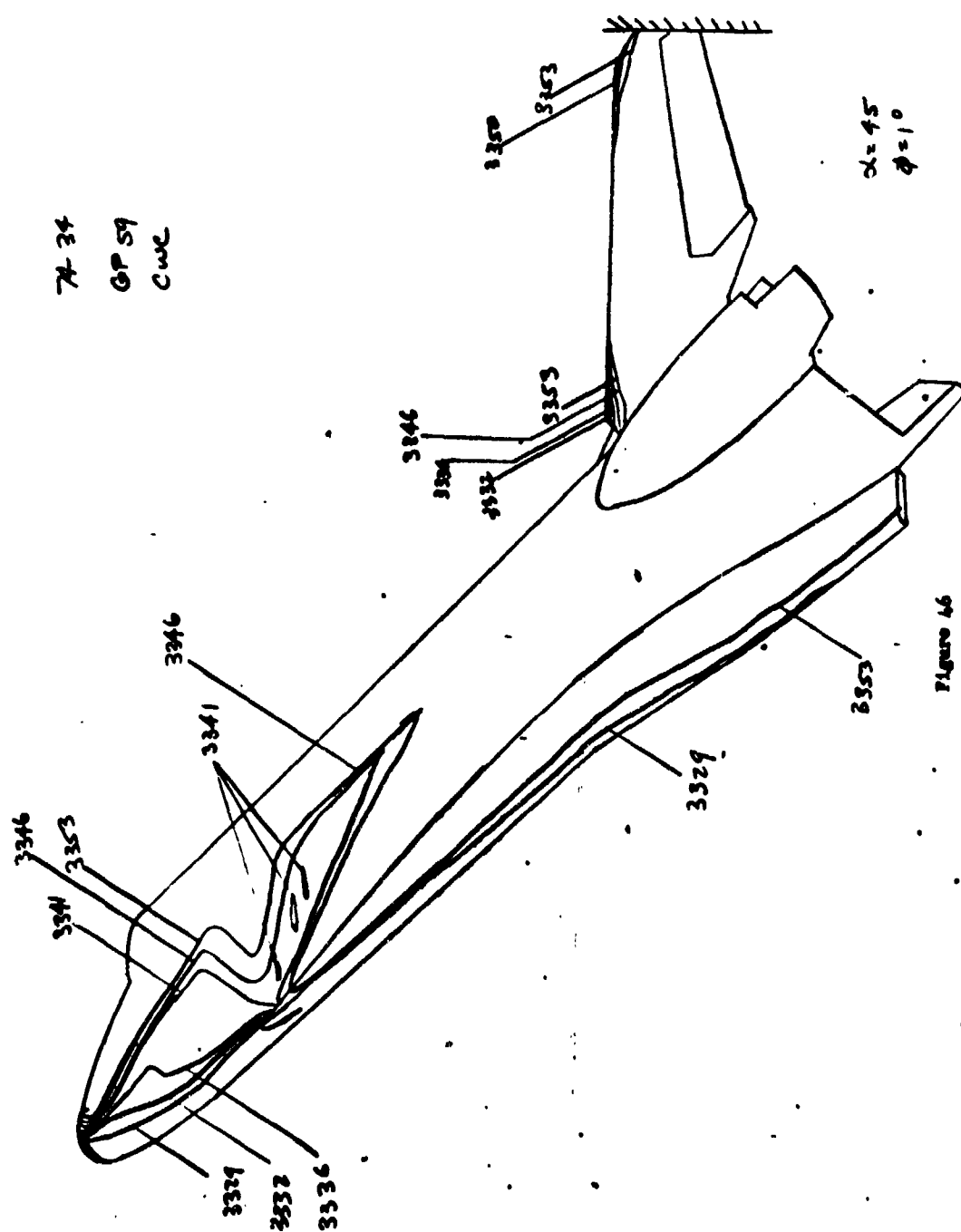
GROUP COMP16 MODEL MACH NO ON(P5IA) TO(DEG R) ALPHA-MODEL ALPHA-SECTION ALPHA-PREBEND ROLL-MODEL YAW  
 SA 3 CREITER E 7.91 110.5 1266 44.84 -14.84 -30.00 -100.00 -0.00

T-TAF P-TAF Q-TAF V-TAF RHO-TAF MU-TAF HE/FT MREF STREF  
 IDEG R) (PSIA) (FT/SEC) (SLUGS/FT3) (LBS-SEC/FT2) (FT-1) (R= .0175E1) (R= .0175E1)

93.7 .012 .533 3751 1.001E-05 7.541E-04 5.425E 05 1.745E-02 5.505E-02

CAMERA HULL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUAR ROOT (RHO/CXK) TBAR(TO) BETA(TO)  
 TOP(T) 7375  
 SIDE(S) 8302  
 MOTTCH(R) 7426

PIC NO	TIME DELTIME	H(TO)	M(TO)/HREF	M(10)	M(10)/HREF	M(10)/HREF	M(10)/HREF	S(TO)
T 9438(125)	33.21	31.02	1.999E-03	.1119	2.527E-03	.1414	2.527E-03	6.067E-03
M 5556(125)	33.21	31.02	1.999E-03	.1119	2.527E-03	.1414	2.527E-03	6.067E-03
S 3314(125)	33.24	31.02	1.999E-03	.1119	2.527E-03	.1414	2.527E-03	6.067E-03
M 5557(125)	35.24	31.95	1.937E-03	.1085	2.450E-03	.1371	2.450E-03	5.884E-03
T 9439(125)	35.27	31.97	1.937E-03	.1085	2.450E-03	.1372	2.450E-03	5.884E-03
S 3315(125)	35.27	31.97	1.937E-03	.1085	2.450E-03	.1372	2.450E-03	5.884E-03
T 9440(125)	37.29	36.00	1.842E-03	.1053	2.379E-03	.1332	2.379E-03	5.713E-03
S 3316(125)	37.29	36.00	1.842E-03	.1053	2.379E-03	.1332	2.379E-03	5.713E-03
M 5558(125)	37.29	36.00	1.842E-03	.1053	2.379E-03	.1332	2.379E-03	5.713E-03
T 9441(125)	39.32	34.03	1.831E-03	.1025	2.315E-03	.1296	2.315E-03	5.559E-03
S 3317(125)	39.32	34.03	1.831E-03	.1025	2.315E-03	.1296	2.315E-03	5.559E-03
M 5559(125)	39.32	34.03	1.831E-03	.1025	2.315E-03	.1296	2.315E-03	5.559E-03
T 9442(125)	46.15	45.44	1.675E-03	.1025	2.117E-03	.1296	2.117E-03	1.404E306

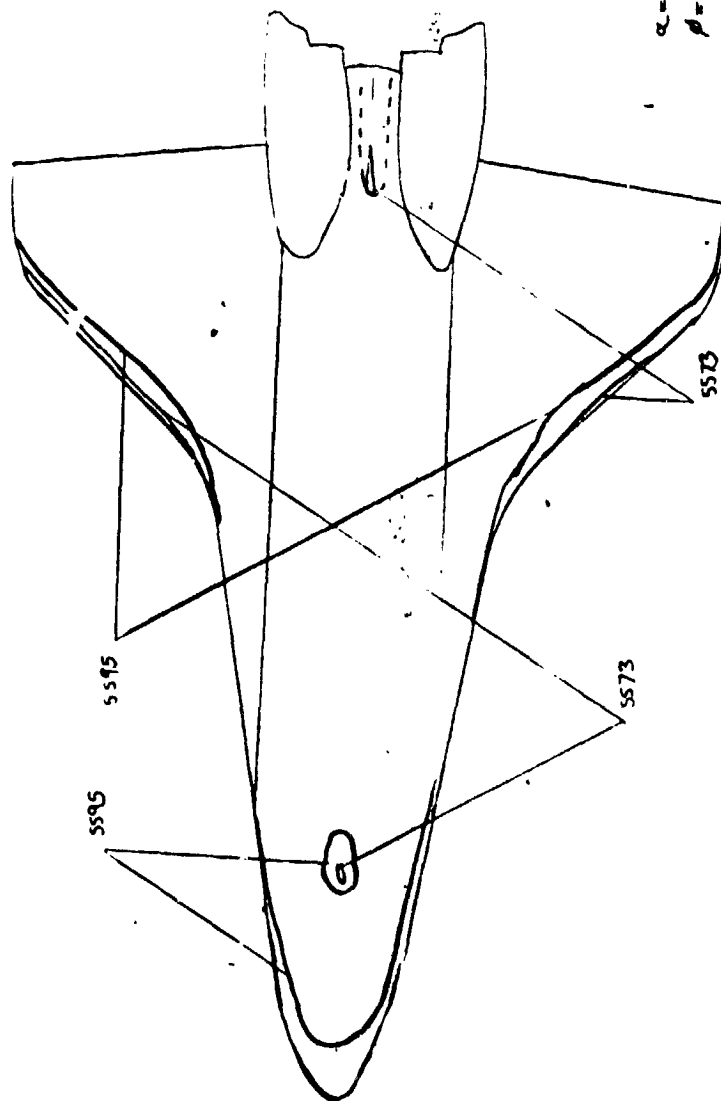


GP 59  
CWC  
DE 11

$\phi = 10$   
 $\phi = 45$

**97 25871**

Comp 59  
8468



$\alpha = 45^\circ$   
 $\beta = 1$

Figure 67

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NASA-RJ ORBITER PEATING

AEDC (ARO, INC.) ARNOLD AFS, TENNESSEE  
VON KARMAN GAS DYNAMICS FACILITY  
50 INCH HYPERSONIC TUNNEL R

WAZ09

GROUP COMPTE MODEL MACH NO PO (PSIA) TO (DEG R) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREBEND ROLL-MODEL YAW  
59 2 ORBITER S 7.91 100.5 1266 44.04 -14.95 -30.00 -101.00 .99  
T-INF P-INF Q-INF V-INF RHO-INF MU-INF RE/FT HREF SREF  
(DEG R) (PSIA) (PSIA) (PSIA) (SLUGS/FT<sup>3</sup>) (LB-SEC/FT<sup>2</sup>) (FT-1) (R<sub>REF</sub>-0.175FT) (R<sub>REF</sub>-0.175FT)  
93.7 .012 .528 3752 1.000E-05 7.545E-08 5.371E 05 1.777E-02 5.532E-02  
CAMERA ROLL NO PAINT IFMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHO/CK) TGRAR(TO) BETA(TO)  
TOP(T) 7442  
SIDE(S) 7434  
MOTION(M) 846R .0475 0 0

PIC NO TIME DELTIME M(TO) M(TO)/HREF M(-9TO) M(-9TO)/HREF M(-9TO)/HREF ST(TO)  
M 5564(113) 1.15 MODEL HAS NOT REACHED CENTERLINE M(-9TO) M(-9TO) M(-9TO) M(-9TO) M(-9TO) M(-9TO)  
T 9650(113) 1.10 MODEL HAS NOT REACHED CENTERLINE M(-9TO) M(-9TO) M(-9TO) M(-9TO) M(-9TO) M(-9TO)  
S 3326(113) 1.10 MODEL HAS NOT REACHED CENTERLINE M(-9TO) M(-9TO) M(-9TO) M(-9TO) M(-9TO) M(-9TO)  
T 9651(113) 2.23 MODEL HAS NOT REACHED CENTERLINE M(-9TO) M(-9TO) M(-9TO) M(-9TO) M(-9TO) M(-9TO)  
M 9669(113) 2.23 MODEL HAS NOT REACHED CENTERLINE M(-9TO) M(-9TO) M(-9TO) M(-9TO) M(-9TO) M(-9TO)  
S 3327(113) 2.25 MODEL HAS NOT REACHED CENTERLINE M(-9TO) M(-9TO) M(-9TO) M(-9TO) M(-9TO) M(-9TO)  
INJECT TIME = 2.20  
T 9652(113) 3.20 DATA NOT YET VALID  
M 5572(113) 3.20 DATA NOT YET VALID  
S 3328(113) 3.23 DATA NOT YET VALID  
T 9653(113) 4.28 3.19 1.126E-03 .0634 1.374E-03 .0773 1.252E-03 .0705 1.252E-03 .0705 3.477E-03  
S 3329(113) 4.28 3.19 1.126E-03 .0634 1.374E-03 .0773 1.252E-03 .0705 1.252E-03 .0705 3.477E-03  
M 5571(113) 4.28 3.19 1.126E-03 .0634 1.374E-03 .0773 1.252E-03 .0705 1.252E-03 .0705 3.477E-03  
T 9654(113) 5.46 4.1P 9.701E-04 .054 1.184E-03 .0667 1.079E-03 .0607 1.079E-03 .0607 2.998E-03  
S 3330(113) 5.46 4.1P 9.701E-04 .054 1.184E-03 .0667 1.079E-03 .0607 1.079E-03 .0607 2.998E-03  
M 5572(113) 5.46 4.1P 9.701E-04 .054 1.184E-03 .0667 1.079E-03 .0607 1.079E-03 .0607 2.998E-03  
T 9655(113) 6.53 5.25 9.650E-04 .0497 1.056E-03 .0594 9.623E-04 .0541 9.623E-04 .0541 2.672E-03  
S 3331(113) 6.53 5.25 9.650E-04 .0497 1.056E-03 .0594 9.623E-04 .0541 9.623E-04 .0541 2.672E-03  
M 5573(113) 6.53 5.25 9.650E-04 .0497 1.056E-03 .0594 9.623E-04 .0541 9.623E-04 .0541 2.672E-03  
T 9656(113) 7.61 6.33 7.841E-04 .0444 9.620E-04 .0542 8.767E-04 .0494 8.767E-04 .0494 2.436E-03  
S 3332(113) 7.61 6.33 7.841E-04 .0444 9.620E-04 .0542 8.767E-04 .0494 8.767E-04 .0494 2.436E-03  
M 5574(113) 7.61 6.33 7.841E-04 .0444 9.620E-04 .0542 8.767E-04 .0494 8.767E-04 .0494 2.436E-03  
T 9657(113) 8.68 7.41 7.246E-04 .0410 9.646E-04 .0540 8.105E-04 .0456 8.105E-04 .0456 2.248E-03  
S 3333(113) 8.68 7.41 7.246E-04 .0410 9.646E-04 .0540 8.105E-04 .0456 8.105E-04 .0456 2.248E-03  
M 5575(113) 8.68 7.41 7.246E-04 .0410 9.646E-04 .0540 8.105E-04 .0456 8.105E-04 .0456 2.248E-03  
T 9658(113) 9.74 8.44 6.418E-04 .0383 9.323E-04 .0468 7.584E-04 .0426 7.584E-04 .0426 2.102E-03

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AEDCTAR, INC., ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL R

NASA-RJ ORBITER PEATING

VA200

GROUP COMP16 MODEL MACH NO P0(P51A) T0(ING R) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREBEND ROLL-MODEL YAW  
 59 2 ORBITER S 7.91 109.9 1287 44.84 -1.85 -30.00 -181.40 .99

(DEG R) (P51A) (P51A) (FT/SEC) (SLUGS/FT) (LB-SEC/FT) (FT-L) (R=.0175EI) (R=.0175EI)  
 93.7 .112 .530 3752 1.084E-05 7.546E-08 5.190E 1.740E-02 5.522E-02

CAMERA ROLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) S E ROOT (RHO/CAK) TBAR(10) BETA(10)  
 TOP(1) 7442  
 SIDE(S) 7434  
 BOTTOM(B) 8464 .04 5 4.543E-02 4.1742E-02

PIC NO	TIME DELT(SEC)	M(10)	M(10)/HREF	M(10)	M(10)/HREF	M(10)	M(10)/HREF	M(10)	M(10)/HREF	ST(10)
T 9666(113)	18.37	4.746E-04	.0269	5.454E-04	.0329	5.335E-04	.0300	5.335E-04	.0300	1.476E-03
T 9667(113)	19.42	4.655E-04	.0261	5.454E-04	.0329	5.335E-04	.0300	5.335E-04	.0300	1.476E-03
S 3343(113)	19.42	4.655E-04	.0261	5.454E-04	.0329	5.335E-04	.0300	5.335E-04	.0300	1.476E-03
M 5585(113)	19.42	4.655E-04	.0261	5.454E-04	.0329	5.335E-04	.0300	5.335E-04	.0300	1.476E-03
T 9668(113)	20.50	4.523E-04	.0254	5.454E-04	.0329	5.335E-04	.0300	5.335E-04	.0300	1.476E-03
S 3344(113)	20.50	4.523E-04	.0254	5.454E-04	.0329	5.335E-04	.0300	5.335E-04	.0300	1.476E-03
M 5586(113)	20.50	4.523E-04	.0254	5.454E-04	.0329	5.335E-04	.0300	5.335E-04	.0300	1.476E-03
T 9669(113)	21.57	4.401E-04	.0247	5.454E-04	.0329	5.335E-04	.0300	5.335E-04	.0300	1.476E-03
S 3345(113)	21.57	4.401E-04	.0247	5.454E-04	.0329	5.335E-04	.0300	5.335E-04	.0300	1.476E-03
M 5587(113)	21.57	4.401E-04	.0247	5.454E-04	.0329	5.335E-04	.0300	5.335E-04	.0300	1.476E-03
T 9670(113)	22.65	4.249E-04	.0241	5.454E-04	.0329	5.335E-04	.0300	5.335E-04	.0300	1.476E-03
S 3346(113)	22.65	4.249E-04	.0241	5.454E-04	.0329	5.335E-04	.0300	5.335E-04	.0300	1.476E-03
M 5588(113)	22.65	4.249E-04	.0241	5.454E-04	.0329	5.335E-04	.0300	5.335E-04	.0300	1.476E-03
T 9671(113)	24.18	4.143E-04	.0233	5.454E-04	.0329	5.335E-04	.0300	5.335E-04	.0300	1.476E-03
M 5589(113)	24.18	4.143E-04	.0233	5.454E-04	.0329	5.335E-04	.0300	5.335E-04	.0300	1.476E-03
S 3347(113)	24.20	4.143E-04	.0233	5.454E-04	.0329	5.335E-04	.0300	5.335E-04	.0300	1.476E-03
M 5590(113)	26.21	3.971E-04	.0223	5.454E-04	.0329	5.335E-04	.0300	5.335E-04	.0300	1.476E-03
T 9672(113)	26.23	3.971E-04	.0223	5.454E-04	.0329	5.335E-04	.0300	5.335E-04	.0300	1.476E-03
S 3348(113)	26.23	3.971E-04	.0223	5.454E-04	.0329	5.335E-04	.0300	5.335E-04	.0300	1.476E-03
T 9673(113)	28.26	3.817E-04	.0214	5.454E-04	.0329	5.335E-04	.0300	5.335E-04	.0300	1.476E-03
S 3349(113)	28.26	3.817E-04	.0214	5.454E-04	.0329	5.335E-04	.0300	5.335E-04	.0300	1.476E-03
M 5591(113)	28.26	3.817E-04	.0214	5.454E-04	.0329	5.335E-04	.0300	5.335E-04	.0300	1.476E-03
T 9674(113)	30.28	3.642E-04	.0206	5.454E-04	.0329	5.335E-04	.0300	5.335E-04	.0300	1.476E-03
M 5592(113)	30.28	3.642E-04	.0206	5.454E-04	.0329	5.335E-04	.0300	5.335E-04	.0300	1.476E-03
S 3350(113)	30.31	3.642E-04	.0206	5.454E-04	.0329	5.335E-04	.0300	5.335E-04	.0300	1.476E-03

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77 (77)

# NASA-RI ORBITER HEATING

VA289

AEDC(RHO,INC.) AMNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL R

GROUP C/MF/G MODEL MACH NO MO(PSTIA) TO(DEC R) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREBEND ROLL-MODEL YAW  
 59 2 ORBITER S 7.91 110.3 1267 44.84 -14.85 -30.00 -181.40 .99

1-TAF P-IMP Q-IMP V-IMP RHO-IMP MU-IMP RE/FT MREF STREF  
 (DEG R) (PSIA) (PSIA) (PSIA) (SLUGS/FT<sup>3</sup>) (LB-SEC/FT<sup>2</sup>) (FT-1) (RHO-0125E1) (RHO-0125E1)  
 93.7 .012 .532 3757 1.000E-05 7.540E-08 5.409E 05 1.704E-02 5.512E-02

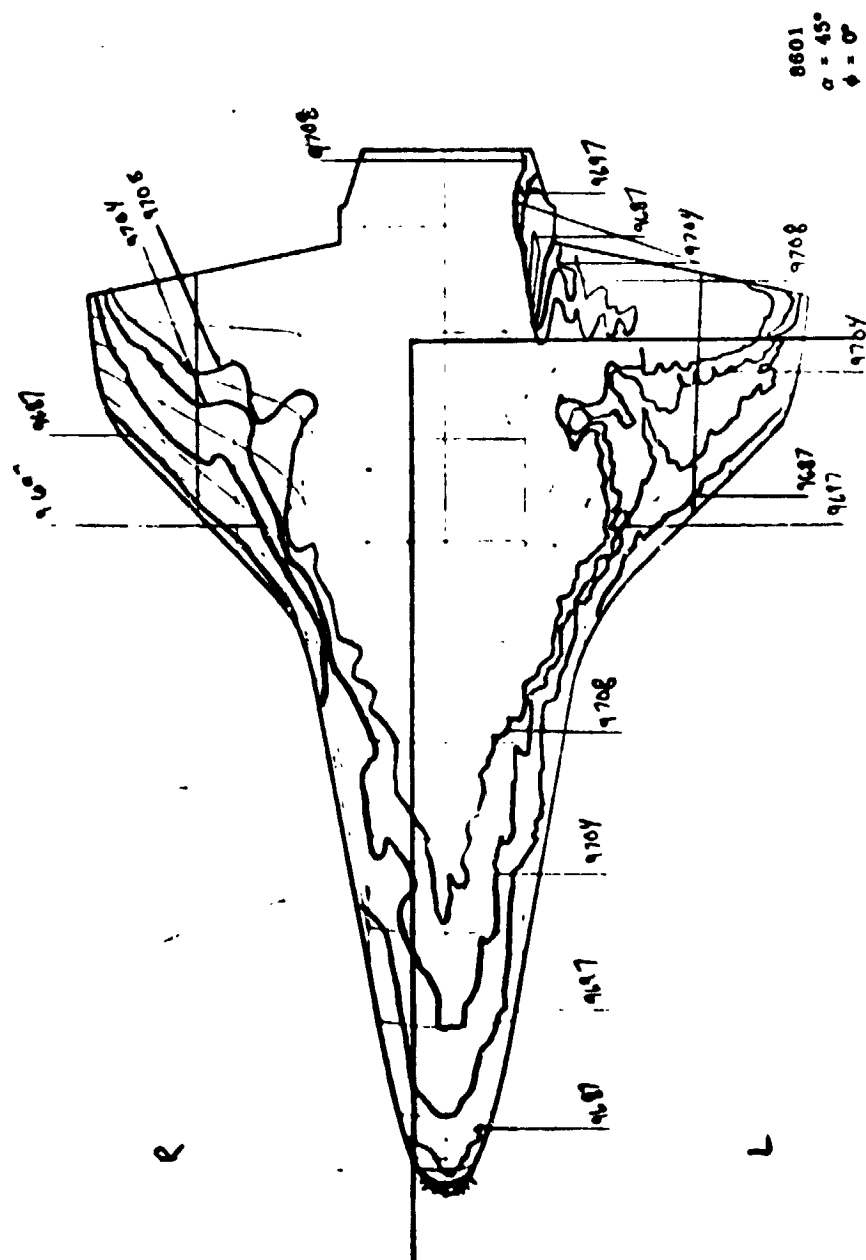
CAMERA ROLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHOXCM) TBAR(ITO) BETA(ITO)  
 TOP(IT) 7442 113 80 .8475 4.543E-02 4.1742E-02  
 SIDE(S) 7436  
 POLICHER 8468

PIC NO TIME DELTIME M(TOI) M(TOI)/MREF M(910) M(910)/MREF M(944TO) M(944TO)/MREF ST(ITO)  
 0 5593(113) 32.31 31.03 1.559E-04 .0260 4.745E-04 .0244 3.950E-04 .0222 1.091E-03  
 1 9475(113) 32.34 31.04 1.558E-04 .0199 4.743E-04 .0243 3.950E-04 .0222 1.091E-03  
 2 3351(113) 32.34 31.04 1.558E-04 .0198 4.743E-04 .0243 3.950E-04 .0222 1.091E-03  
 3 9474(113) 30.36 33.09 1.447E-04 .0193 4.208E-04 .0236 3.835E-04 .0215 1.057E-03  
 4 3352(113) 34.36 33.09 1.447E-04 .0193 4.208E-04 .0236 3.835E-04 .0215 1.057E-03  
 5 5594(113) 34.36 33.09 1.447E-04 .0193 4.208E-04 .0236 3.835E-04 .0215 1.057E-03  
 6 9477(113) 30.39 35.11 1.346E-04 .0187 4.085E-04 .0229 3.722E-04 .0208 1.024E-03  
 7 5595(113) 30.39 35.11 1.346E-04 .0187 4.085E-04 .0229 3.722E-04 .0208 1.024E-03  
 8 3353(113) 30.42 35.14 1.345E-04 .0188 4.083E-04 .0229 3.721E-04 .0209 1.026E-03  
 9 5596(113) 30.42 35.14 1.345E-04 .0187 4.083E-04 .0229 3.721E-04 .0209 1.026E-03  
 10 9478(113) 30.44 37.17 1.252E-04 .0182 3.970E-04 .0222 3.619E-04 .0203 9.954E-04  
 11 3354(113) 30.44 37.17 1.252E-04 .0182 3.970E-04 .0222 3.619E-04 .0203 9.954E-04  
 12 9479(113) 39.02 39.19 1.107E-04 .0177 3.866E-04 .0217 3.523E-04 .0197 9.693E-04  
 13 3355(113) 40.47 39.19 1.107E-04 .0177 3.866E-04 .0217 3.523E-04 .0197 9.693E-04  
 14 5597(113) 40.47 39.19 1.107E-04 .0177 3.866E-04 .0217 3.523E-04 .0197 9.693E-04

247

410

Group 60  
7442  
NO



8601  
 $\sigma = 45^\circ$   
 $\phi = 0^\circ$



21 9173

3011V34 031100Z 18-0500

REDICHAM, INC.) ARNOLD AFB, TENNESSEE  
VON KAMAN GAS DYNAMICS FACILITY  
30 INCH HYPERSONIC TUNNEL A

4301 6% 145058 JAL-1 TUNNEL A

GROUP	CORR16	MODEL	MACH	NO(PSTA)	TO(DEL P)	ALPH-S-MODEL	ALPHA-SECTION	ALPHA-PREBEND	ROLL-MODEL	YAW
49	A	CRT1TFM W3	7.91	110.2	1267	4.085	-16.85	-30.00	-100.00	-0.00

T-1A-F	D-1-WF	Q-1-WF	V-1-WF	WMO-1-WF	MU-1-WF	RF-1-F	MR-F	ST-F
(DEG. W)	(OS. L)	(OS. L)	(E/F. SEC)	(SL. MGS/F. Y)	(LR-SEC/F. Y2)	(F. I-1)	(H. A-0.175F. I)	(R. =0.175F. I)
81.0	-0.1	-532	3753	1.000F-05	7.55JF-AA	5.401E 05	1.703F-02	5.514E-02

WELL NO	PAINT IFWP (DEG F)	INITIAL TEMP (DEG F)	SQUARE ROOT (RMOLCKX)	TSAR(TO)	BET'(TO)
7442					
7436	259	80	.0535		0

[illegible]

Model	Time	Model	Time	Model	Time	Model	Time
Model 1	1.08	Model 2	1.08	Model 3	1.08	Model 4	1.08
Model 5	1.08	Model 6	1.08	Model 7	1.08	Model 8	1.08
Model 9	1.08	Model 10	1.08	Model 11	1.08	Model 12	1.08
Model 13	1.08	Model 14	1.08	Model 15	1.08	Model 16	1.08
Model 17	1.08	Model 18	1.08	Model 19	1.08	Model 20	1.08
Model 21	1.08	Model 22	1.08	Model 23	1.08	Model 24	1.08
Model 25	1.08	Model 26	1.08	Model 27	1.08	Model 28	1.08
Model 29	1.08	Model 30	1.08	Model 31	1.08	Model 32	1.08
Model 33	1.08	Model 34	1.08	Model 35	1.08	Model 36	1.08
Model 37	1.08	Model 38	1.08	Model 39	1.08	Model 40	1.08
Model 41	1.08	Model 42	1.08	Model 43	1.08	Model 44	1.08
Model 45	1.08	Model 46	1.08	Model 47	1.08	Model 48	1.08
Model 49	1.08	Model 50	1.08	Model 51	1.08	Model 52	1.08
Model 53	1.08	Model 54	1.08	Model 55	1.08	Model 56	1.08
Model 57	1.08	Model 58	1.08	Model 59	1.08	Model 60	1.08
Model 61	1.08	Model 62	1.08	Model 63	1.08	Model 64	1.08
Model 65	1.08	Model 66	1.08	Model 67	1.08	Model 68	1.08
Model 69	1.08	Model 70	1.08	Model 71	1.08	Model 72	1.08
Model 73	1.08	Model 74	1.08	Model 75	1.08	Model 76	1.08
Model 77	1.08	Model 78	1.08	Model 79	1.08	Model 80	1.08
Model 81	1.08	Model 82	1.08	Model 83	1.08	Model 84	1.08
Model 85	1.08	Model 86	1.08	Model 87	1.08	Model 88	1.08
Model 89	1.08	Model 90	1.08	Model 91	1.08	Model 92	1.08
Model 93	1.08	Model 94	1.08	Model 95	1.08	Model 96	1.08
Model 97	1.08	Model 98	1.08	Model 99	1.08	Model 100	1.08

DATA NOT YET VALID  
DATA NOT YET VALID

DATA NOT YET VALID

7.750E-93 .434

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7/ 9/73

NASA-RE ORBITER HEATING  
 AFDC(ARD, INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL R

VAZAG

GROUP CONFID MODEL MACH NO P0(PSTA) T0(DEL R) ALPHA-MODEL ALPHA-SECTION ALPHA-PREBEND ROLL-MODEL YAW  
 60 6 ORBITER R3 7.91 111.1 1267 44.85 -14.85 -30.00 -180.00 -0.00  
 T-INF P-TMF Q-INF W-INF MU-INF RF/FT MREF STREF  
 (DEG R) (PSTA) (PSTA) (FT/SEC) (SLUGS/FT2) (LBS-SEC/FT2) (EI-1) (R# .0175FI) (R# .0175ET)  
 93.8 .012 .536 3754 1.095E-05 7.551E-08 5.443E 05 1.790E-02 5.494E-02  
 CAMERA HULL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHOCK) TRAR(TO) BETA(TO)  
 T0C(T) 7442  
 SIDE(S) 7434  
 MOTION(2) 8468  
 .0435 2.338E-01 2.5558E-01

PIC NO TYPE DELTIME H(TO) M(TO)/MREF M(.910) M(.9410) M(.94410) M(.94410)/MREF ST(TO)  
 T 9706(250) 33.06 31.77 2.426E-03 .1355 3.097E-03 .1730 2.758E-03 .1541 7.332E-03  
 S 3702(250) 33.06 31.77 2.426E-03 .1355 3.097E-03 .1730 2.758E-03 .1541 7.332E-03  
 M 9424(250) 33.06 31.77 2.426E-03 .1355 3.097E-03 .1730 2.758E-03 .1541 7.332E-03  
 T 9707(250) 35.09 33.84 2.352E-03 .1313 3.003E-03 .1476 2.674E-03 .1493 7.102E-03  
 M 9425(250) 35.09 33.84 2.352E-03 .1313 3.003E-03 .1476 2.674E-03 .1493 7.102E-03  
 S 3703(250) 35.12 33.82 2.351E-03 .1313 3.002E-03 .1476 2.673E-03 .1492 7.100E-03  
 M 9426(250) 37.12 35.82 2.244E-03 .1274 2.917E-03 .1427 2.597E-03 .1449 6.887E-03  
 T 9708(250) 37.14 35.84 2.244E-03 .1275 2.916E-03 .1428 2.597E-03 .1450 6.896E-03  
 S 3384(250) 37.14 35.84 2.244E-03 .1275 2.916E-03 .1428 2.597E-03 .1450 6.896E-03  
 MODEL HAS LEFT CENTERLINE  
 T 9709(250) 39.17 37.88 2.222E-03 .1240 2.874E-03 .1583 2.524E-03 .1410 6.703E-03  
 S 3385(250) 39.17 37.88 2.222E-03 .1240 2.874E-03 .1583 2.524E-03 .1410 6.703E-03  
 M 9427(250) 39.17 37.88 2.222E-03 .1240 2.874E-03 .1583 2.524E-03 .1410 6.703E-03

251

415

Group 61  
7442  
MD

8601  
 $\alpha = 45^\circ$   
 $\phi = 0^\circ$

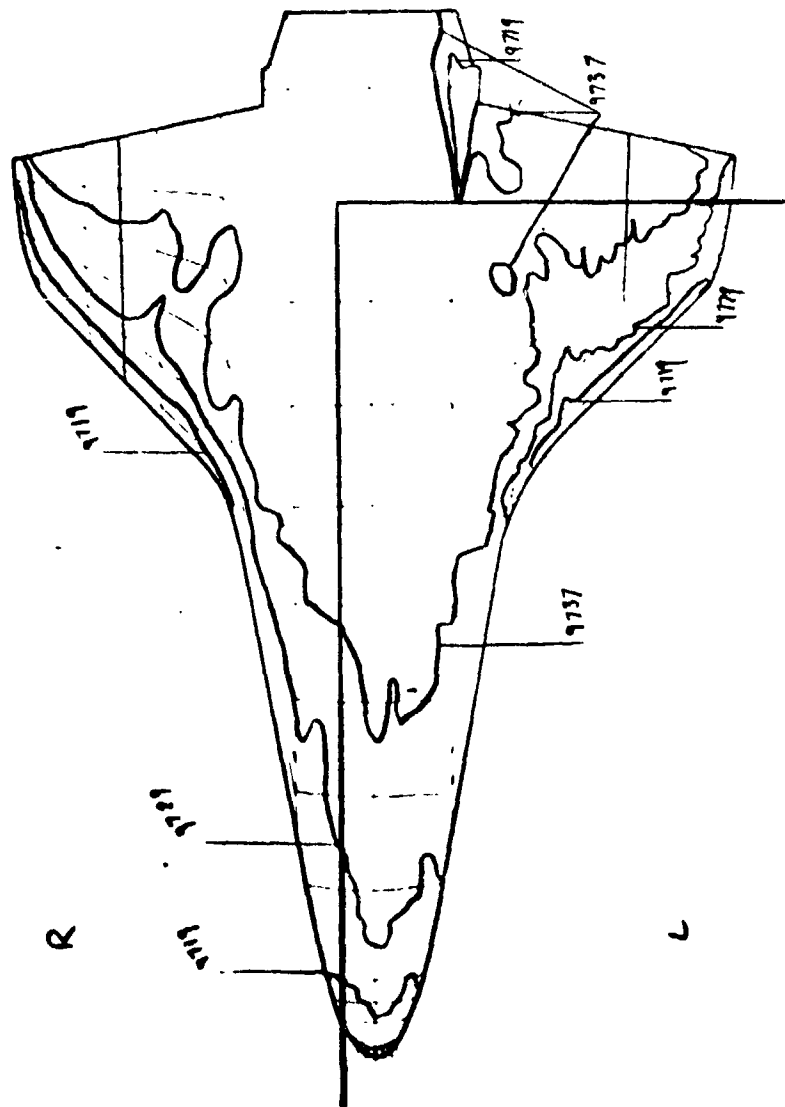


Figure 49

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NASA-RI ORBITER HEATING

4299

AEDC(AHO-INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL R

GROUP	CANF16	MODEL	MACH NO	ON(P51A)	TO(DEC)	ALPHA-MODEL	ALPHA-SECTION	ALPHA-PREBEND	ROLL-MODEL	YAW
61	5	ORBITER R2	7.91	110.2	1269	44.84	-16.84	-30.00	-180.00	-0.00
T-1NF	P-1NF	Q-1NF	V-1NF	RNO-1NF	MU-1NF	RE/FI	MREF	STREF		
(DEG R)	(PSIA)	(PSIA)	(FT/SEC)	(SLUGS/FT)	(LB-SEC/FT)	(FT-1)	(R-0175E1)	(R-0175F		
93.6	-012	-532	3755	1.045E-05	7.550E-04	5.394E 05	1.743E-02	5.519E-02		
CAMERA		HOLL MU	PAINT IFMP (DEG F)	INITIAL TEMP (DEG F)	SQUARE ROOT (RHOXCAK)	TRAR(TO)	BETA(TO)			
TOP(1)	7442									
SIDE(S)	7434	250	79		.8535		0	0		
MOTICH(B)	8468									

PIC NO	TIME DELTIME	M(TO)	M(TO)/MREF	M(.910)	M(.910)/MREF	M(.944TO)	M(.944TO)/MREF	ST(10)
M 5629(250)	1.015	MODEL HAS NOT REACHED CENTERLINE						
T 9710(250)	1.110	MODEL HAS NOT REACHED CENTERLINE						
S 3394(250)	1.110	MODEL HAS NOT REACHED CENTERLINE						
M 5624(250)	2.023	MODEL HAS NOT REACHED CENTERLINE						
T 9711(250)	2.025	MODEL HAS NOT REACHED CENTERLINE						
S 3397(250)	2.025	MODEL HAS NOT REACHED CENTERLINE						
INJECT TIME =	2.30							
M 5630(250)	3.020	DATA NOT YET VALID						
T 9712(250)	3.022	DATA NOT YET VALID						
S 3398(250)	3.023	DATA NOT YET VALID						
T 9713(250)	4.028	7.846E-03	.4373	9.963E-03	.5582	8.874E-03	.4972	2.375E-02
M 5631(250)	4.028	7.846E-03	.4373	9.963E-03	.5582	8.874E-03	.4972	2.375E-02
S 3394(250)	4.041	7.775E-03	.4352	9.923E-03	.5554	8.838E-03	.4947	2.361E-02
T 9714(250)	5.046	4.722E-03	.3763	8.579E-03	.4802	7.642E-03	.4277	2.041E-02
M 5632(250)	5.046	4.722E-03	.3763	8.579E-03	.4802	7.642E-03	.4277	2.041E-02
T 9715(250)	6.053	5.922E-03	.3355	7.648E-03	.4283	6.812E-03	.3815	1.821E-02
M 5633(250)	6.053	5.922E-03	.3355	7.648E-03	.4283	6.812E-03	.3815	1.821E-02
T 9716(250)	7.061	5.448E-03	.3055	6.966E-03	.3899	6.204E-03	.3473	1.657E-02
M 5634(250)	7.061	5.448E-03	.3055	6.966E-03	.3899	6.204E-03	.3473	1.657E-02
T 9717(250)	8.068	5.045E-03	.2824	6.439E-03	.3604	5.735E-03	.3210	1.532E-02
M 5635(250)	8.068	5.045E-03	.2824	6.439E-03	.3604	5.735E-03	.3210	1.532E-02
T 9718(250)	9.074	4.720E-03	.2641	6.025E-03	.3371	5.366E-03	.3002	1.432E-02
M 5636(250)	9.074	4.720E-03	.2641	6.025E-03	.3371	5.366E-03	.3002	1.432E-02

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NASA-WI ORBITER HEATLINE

AFDC(ARO-INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL R

VA2R9

GROUP	CONFIG	MODEL	MACH NO	ORIP(SIA)	IN( DEG R)	ALPHA-MODEL	ALPHA-SECTOR	ALPHA-PREREND	ROLL-MODEL	YAW
61	S	OR-17FV R2	7.91	110.7	1269	44.84	-14.84	-30.00	-180.00	-0.00
T-INF P-INF Q-INF V-INF W-INF R-INF S-INF T-INF U-INF										
DEG M (PSIA) (PSIA) (PSIA) (FT/SEC) (SLUGS/FT <sup>3</sup> ) (LW-SEC/FT <sup>2</sup> ) (FI-1) (R= .0175FI) (R= .0175FI)										
93.9	.012	.534	3755	1.000E-05	7.550E-05	5.416E 05	1.747E-02	5.507E-02		
CAMERA	ROLL NO	PAINT TEMP (DEG F)	INITIAL TEMP (DEG F)	SQUARE ROOT (HMOACAK)	TRAX(TO)	BETA(TO)				
TOP(T)	7442		79	.0535	2.344E-01	2.5038E-01				
SIDF(S)	7434									
MOTTON(R)	8468									

PIC NO	TIME	DELTIME	M(TO)	M(TO)/HREF	M(.910)	M(.910)/HREF	M(.944TO)	H(.944TO)/HREF	ST(TO)
S 3394(250)	9.76	9.47	4.713E-03	.2637	4.014E-03	.3366	5.358E-03	.2908	1.430E-02
T 9114(250)	10.81	9.52	4.445E-03	.2484	5.474E-03	.3176	5.054E-03	.2829	1.350E-02
M 4431(250)	10.81	9.52	4.445E-03	.2484	5.474E-03	.3176	5.054E-03	.2829	1.350E-02
S 3395(250)	10.84	9.54	4.440E-03	.2443	5.465E-03	.3169	5.047E-03	.2822	1.346E-02
T 9120(250)	11.89	10.61	4.214E-03	.2356	5.378E-03	.3007	4.790E-03	.2479	1.278E-02
M 4434(250)	11.89	10.61	4.214E-03	.2356	5.378E-03	.3007	4.790E-03	.2479	1.278E-02
S 3396(250)	11.89	10.61	4.214E-03	.2356	5.378E-03	.3007	4.790E-03	.2479	1.278E-02
T 9121(250)	12.56	11.67	4.015E-03	.2246	5.124E-03	.2847	4.564E-03	.2554	1.218E-02
M 4435(250)	12.56	11.67	4.015E-03	.2246	5.124E-03	.2847	4.564E-03	.2554	1.218E-02
S 3397(250)	14.04	12.76	3.842E-03	.2187	4.803E-03	.2741	4.367E-03	.2441	1.164E-02
T 9122(250)	14.04	12.76	3.842E-03	.2187	4.803E-03	.2741	4.367E-03	.2441	1.164E-02
M 4436(250)	14.04	12.76	3.842E-03	.2187	4.803E-03	.2741	4.367E-03	.2441	1.164E-02
S 3398(250)	15.09	13.80	3.609E-03	.2063	4.713E-03	.2633	4.174E-03	.2345	1.117E-02
T 9123(250)	15.12	13.83	3.609E-03	.2063	4.708E-03	.2633	4.174E-03	.2345	1.117E-02
M 4437(250)	15.12	13.83	3.609E-03	.2063	4.708E-03	.2633	4.174E-03	.2345	1.117E-02
S 3399(250)	16.17	14.88	3.504E-03	.2063	4.539E-03	.2534	4.043E-03	.2241	1.078E-02
T 9124(250)	16.17	14.88	3.504E-03	.2063	4.539E-03	.2534	4.043E-03	.2241	1.078E-02
M 4438(250)	16.17	14.88	3.504E-03	.2063	4.539E-03	.2534	4.043E-03	.2241	1.078E-02
S 3400(250)	16.19	14.90	3.503E-03	.2063	4.535E-03	.2535	4.034E-03	.2258	1.076E-02
T 9125(250)	17.24	15.95	3.434E-03	.2119	4.383E-03	.2469	3.904E-03	.2181	1.039E-02
M 4439(250)	17.24	15.95	3.434E-03	.2119	4.383E-03	.2469	3.904E-03	.2181	1.039E-02
S 3401(250)	17.27	15.96	3.431E-03	.2119	4.380E-03	.2469	3.901E-03	.2182	1.040E-02
T 9126(250)	18.32	17.03	3.234E-03	.2054	4.242E-03	.2371	3.774E-03	.2112	1.007E-02
M 4440(250)	18.32	17.03	3.234E-03	.2054	4.242E-03	.2371	3.774E-03	.2112	1.007E-02
S 3402(250)	18.35	17.05	3.231E-03	.2057	4.239E-03	.2370	3.774E-03	.2111	1.006E-02

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7/ 9/73

AFDC(ARM, INC.) ANNCLU AFS, TENNESSEE  
VON KARMAN GAS DYNAMICS FACILITY  
50 INCH HYPERSONIC TUNNEL R

NASA-R1 ORBITER HEATING  
W4299

GROUP CONFID MODEL MACH NO ORIP(SIA) TO(DEC R) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREBEND ROLL-MODEL YAW  
61 5 ORBITER 52 7.91 113.9 1268 44.84 -14.84 -30.00 -180.00 -0.00

T-1AF O-1NF Q-1NF V-1NF MU-1NF PE/FT MREF STREF  
(DEG R) (PSIA) (FI/SEC) (SLUGS/FI) (LB-SEC/FI) (FI-1) (R-0.0175E1) (R-0.0175E1)  
93.9 .012 .535 3755 1.092E-05 7.557E-04 5.427E-05 1.749E-02 5.502E-02

CAMERA ROLL NO PAINT IFMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHOCAR) TSAR(TO) BETA(TO)  
TOP(T) 7442 79 .0535 2.344E-01 2.5638E-01  
SLOF(S) 7434  
MOT(MIN) 8468

PTC NO	TIME	MELTIME	M(TO)	M(TO)/MREF	M(-9TO)/MREF	M(-94TO)	M(-94TO)/MREF	ST(TO)
T 9727(250)	19.40	18.14	3.224E-03	.1801	4.114E-03	3.655E-03	.2048	9.752E-03
S 3403(250)	19.40	18.14	1.224E-03	.1801	4.114E-03	3.655E-03	.2048	9.752E-03
M 5651(250)	19.40	18.14	3.224E-03	.1801	4.114E-03	3.655E-03	.2048	9.752E-03
T 9728(250)	20.47	19.14	1.132E-03	.1751	3.997E-03	3.566E-03	.1990	9.486E-03
S 3404(250)	20.47	19.14	3.132E-03	.1751	3.997E-03	3.566E-03	.1990	9.486E-03
M 5646(250)	20.47	19.14	1.132E-03	.1751	3.997E-03	3.566E-03	.1990	9.486E-03
T 9729(250)	21.55	20.24	3.047E-03	.1703	3.890E-03	3.464E-03	.1936	9.222E-03
S 3405(250)	21.55	20.24	1.047E-03	.1703	3.890E-03	3.464E-03	.1936	9.222E-03
M 5647(250)	21.55	20.24	3.047E-03	.1703	3.890E-03	3.464E-03	.1936	9.222E-03
T 9730(250)	23.03	21.73	2.942E-03	.1643	3.755E-03	3.345E-03	.1868	8.856E-03
S 3406(250)	23.03	21.73	2.942E-03	.1643	3.755E-03	3.345E-03	.1868	8.856E-03
M 5648(250)	23.03	21.73	2.942E-03	.1643	3.755E-03	3.345E-03	.1868	8.856E-03
T 9731(250)	25.05	23.74	2.814E-03	.1571	3.591E-03	3.199E-03	.1786	8.507E-03
S 3407(250)	25.05	23.74	2.814E-03	.1571	3.591E-03	3.199E-03	.1786	8.507E-03
M 5649(250)	25.05	23.74	2.814E-03	.1571	3.591E-03	3.199E-03	.1786	8.507E-03
T 9732(250)	25.08	23.78	2.812E-03	.1570	3.589E-03	3.197E-03	.1785	8.495E-03
S 3408(250)	25.08	23.78	2.701E-03	.1504	3.447E-03	3.074E-03	.1715	8.166E-03
M 5650(250)	25.08	23.78	2.701E-03	.1504	3.447E-03	3.074E-03	.1715	8.166E-03
T 9733(250)	27.11	25.81	2.700E-03	.1504	3.446E-03	3.069E-03	.1714	8.162E-03
S 3409(250)	27.11	25.81	2.601E-03	.1452	3.319E-03	2.954E-03	.1650	7.856E-03
M 5651(250)	27.11	25.81	2.601E-03	.1452	3.319E-03	2.954E-03	.1650	7.856E-03
T 9734(250)	29.13	27.84	2.600E-03	.1452	3.318E-03	2.953E-03	.1650	7.859E-03
S 3410(250)	29.13	27.84	2.510E-03	.1400	3.203E-03	2.853E-03	.1592	7.575E-03
M 5652(250)	29.13	27.84	2.510E-03	.1400	3.203E-03	2.853E-03	.1592	7.575E-03
T 9735(250)	31.16	29.87	2.510E-03	.1400	3.203E-03	2.853E-03	.1592	7.575E-03
S 3411(250)	31.16	29.87	2.420E-03	.1353	3.100E-03	2.761E-03	.1538	7.303E-03
M 5653(250)	31.16	29.87	2.420E-03	.1353	3.100E-03	2.761E-03	.1538	7.303E-03

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7/ 9/73

NASA-R1 ORBITER HEATING

AEDC(AMM-INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL R

VA249

WROJUP	CONFIG	MODEL	MACH NO	POI(PSTA)	TOI(EG R)	ALPHA-MODEL	ALPHA-SECTION	ALPHA-PREBEND	ROLL-MODEL	YAW
61	S ORBITER R2		7.91	111.6	1269	44.84	-14.84	-30.00	-180.00	-0.00
T-14F	P-INF	P-INF	V-INF	RNO-INF	WU-INF	RF/FT	HREF	STREF		
(DEG R)	(PSTA)	(PSIA)	(FT/SEC)	(SLUGS/ETZ)	(LB-SEC/ETZ)	(FT-1)	(R= .0175ET)	(R= .0175ET)		
93.9	.012	.539	3756	1.100E-05	7.557F-08	5.466E 05	1.705E-02	5.482E-02		
CAMPER	KULL NO	PAINT IFMP	(DEG F)	INITIAL TEMP	(DEG F)	SQUARE ROOT	(RHOXCHK)	TRAN(ITO)	BETA(ITO)	
TOP(IT)	7462									
SINF(S)	7434		250							
MOITCM(R)	8468							2.344E-01	2.5638E-01	

PIC NO	TIME DELT	M(ITO)	M(ITO)/HREF	M(.910)	M(.910)/HREF	M(.944TO)	M(.944TO)/HREF	ST(ITO)
S 7411(250)	33.21	2.42MF-03	.1355	3.099E-03	.1729	2.760E-03	.1540	7.327E-03
M 5654(250)	35.22	2.355F-03	.1313	3.008E-03	.1676	2.677E-03	.1493	7.101E-03
T 9736(250)	35.24	2.354F-03	.1314	3.005E-03	.1677	2.676E-03	.1494	7.111E-03
S 7412(250)	35.24	2.344F-03	.1314	3.005E-03	.1677	2.676E-03	.1494	7.111E-03
T 9737(250)	37.27	2.247E-03	.1276	2.919E-03	.1629	2.600E-03	.1451	6.902E-03
S 7413(250)	37.27	2.247E-03	.1276	2.919E-03	.1629	2.600E-03	.1451	6.902E-03
M 5655(250)	37.27	2.247E-03	.1276	2.919E-03	.1629	2.600E-03	.1451	6.902E-03
	38.67	MODEL WAS LEFT CENTRAL LINE						
T 9734(250)	39.20	2.225E-03	.1241	2.840E-03	.1584	2.529E-03	.1411	6.709E-03
S 7414(250)	39.20	2.225F-03	.1241	2.840E-03	.1584	2.529E-03	.1411	6.709E-03
M 5656(250)	39.20	2.225F-03	.1241	2.840E-03	.1584	2.529E-03	.1411	6.709E-03

12  
 05  
 05

Group 62  
7434  
NO

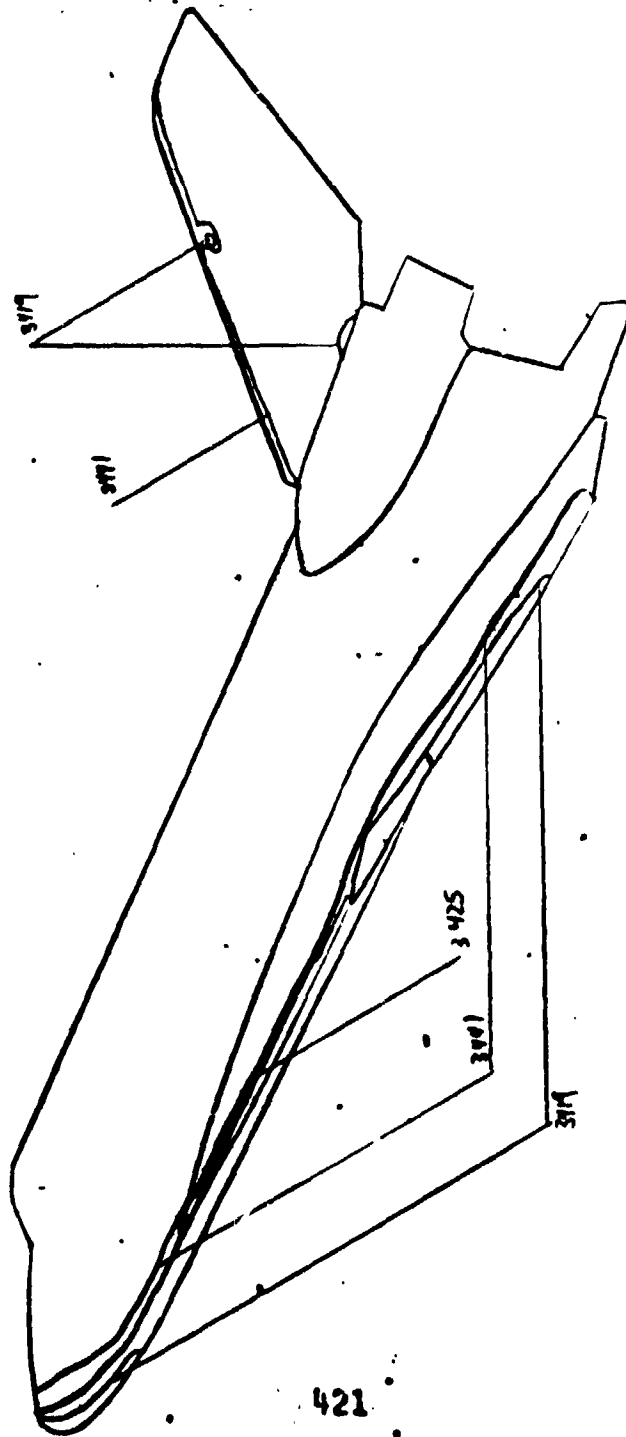


Figure 90



Group 62  
8 1/2 B

4525  
 $\alpha = 25^\circ$   
 $\phi = 0^\circ$

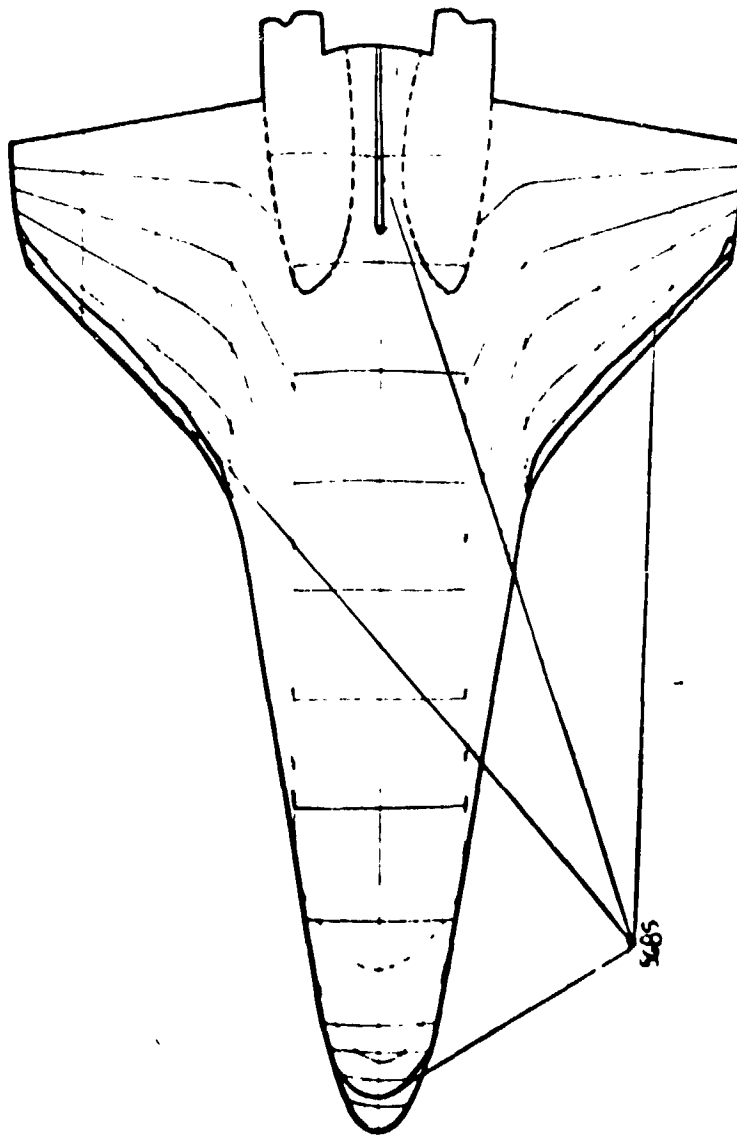


Figure 52

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7/ 9/73

NASA-R1 ORBITER HEATING  
 AFOSI/AMC-1 AMNOLU AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL #

W2299

GROUP	CNTRIC	MODEL	MACH NO	PO(PSTIA)	TO(DEC M)	ALPHA-MODEL	ALPHA-SECTION	ALPHA-PREBEND	ROLL-MODEL	YAW
62	7	ORBITER 5	7.91	111.4	1266	25.02	4.99	-30.00	-120.00	-0.00
T-1AF	P-1NF	Q-1NF	V-1NF	RHO-1NF	MU-1NF	RF/FT	MREF	STREF		
(DEC M)	(PSTIA)	(FT/SEC)	(SLUGS/FT <sup>3</sup> )	(LBS-SEC/FT <sup>2</sup> )	(FI-1)	(Hr .0175FI)	(Hr .0175FI)			
93.7	.912	.530	3751	1.100E-05	7.542E-09	5.473E 05	1.793E-02	5.480E-02		
CAPREA	HOLL NO	PAINT ICUP	(DEC F)	INITIAL TEMP (DEC F)	SQUARE ROOT (RHOXCAK)	TRAR(TO)	BETA(TO)			
TOP(T)	7442			79	.0494					
SINF(S)	7434									
MOT(MIN)	844H									

PIC NO	TIME DELTIME	W(TO)	-W(TO)/MREF	W(.910)	W(.910)/MREF	W(.90210)	W(.90210)/MREF	ST(TO)
T 0734(150)	1.15	MODEL WAS NOT REACHED CENTERLINE						
M 5457(150)	1.15	MODEL WAS NOT REACHED CENTERLINE						
S 3415(150)	1.18	MODEL WAS NOT REACHED CENTERLINE						
T 0740(150)	2.23	MODEL WAS NOT REACHED CENTERLINE						
M 5458(150)	2.23	MODEL WAS NOT REACHED CENTERLINE						
S 3416(150)	2.25	MODEL WAS NOT REACHED CENTERLINE						
INJECT TIME "	2.24							
T 0741(150)	3.20	DATA NOT YET VALID						
M 5459(150)	3.20	DATA NOT YET VALID						
S 3417(150)	3.20	DATA NOT YET VALID						
T 0742(150)	4.20	2.645E-03	.1473	3.243E-03	.1916	3.247E-03	.1807	7.976E-03
M 5460(150)	4.20	2.645E-03	.1473	3.243E-03	.1916	3.247E-03	.1807	7.976E-03
S 3418(150)	4.20	2.645E-03	.1473	3.243E-03	.1916	3.247E-03	.1807	7.976E-03
T 0743(150)	5.46	2.279E-03	.1269	2.811E-03	.1566	2.797E-03	.1558	6.879E-03
M 5461(150)	5.46	2.279E-03	.1269	2.811E-03	.1566	2.797E-03	.1558	6.879E-03
S 3419(150)	5.46	2.279E-03	.1269	2.811E-03	.1566	2.797E-03	.1558	6.879E-03
T 0744(150)	6.51	2.037E-03	.1134	2.513E-03	.1399	2.500E-03	.1392	6.143E-03
M 5462(150)	6.51	2.037E-03	.1134	2.513E-03	.1399	2.500E-03	.1392	6.143E-03
S 3420(150)	6.53	2.037E-03	.1132	2.507E-03	.1396	2.494E-03	.1389	6.134E-03
T 0745(150)	7.58	1.855E-03	.1033	2.295E-03	.1274	2.277E-03	.1268	5.599E-03
M 5463(150)	7.58	1.855E-03	.1033	2.295E-03	.1274	2.277E-03	.1268	5.599E-03
S 3421(150)	7.61	1.855E-03	.1031	2.294E-03	.1271	2.272E-03	.1265	5.583E-03
T 0746(150)	8.66	1.715E-03	.0955	2.115E-03	.1177	2.104E-03	.1172	5.171E-03
M 5464(150)	8.66	1.715E-03	.0955	2.115E-03	.1177	2.104E-03	.1172	5.171E-03
S 3422(150)	8.67	1.712E-03	.0952	2.111E-03	.1174	2.101E-03	.1170	5.166E-03
T 0747(150)	9.74	1.632E-03	.0892	1.976E-03	.1100	1.966E-03	.1095	4.834E-03
M 5465(150)	9.74	1.632E-03	.0892	1.976E-03	.1100	1.966E-03	.1095	4.834E-03

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11 9/73

AEROCRAFT, INC.) ARNOLD AFB, TENNESSEE  
VON KARMAN GAS DYNAMICS FACILITY  
- 50 INCH HYPERSONIC TUNNEL

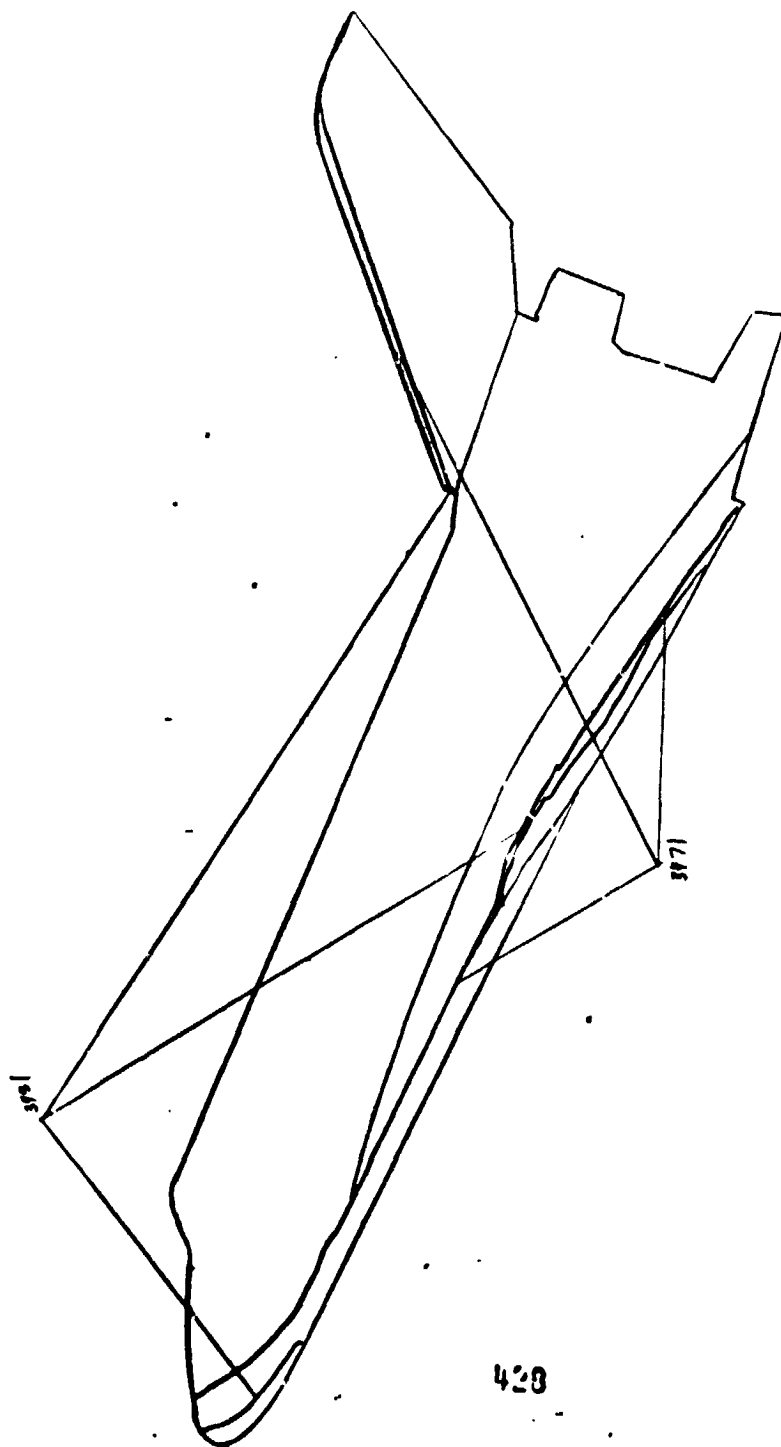
WATER	CONF	MODEL	WAVE NO	W(PSIA)	INDEU W	ALPHA-MODEL	ALPHA-SECTION	ALPHA-PREHEND	ROLL-MODEL	YAW
67	2	CR11EM S	7.91	110.9	12.5	25.0?	4.98	-30.00	-180.00	-0.00

CAMERA	WOL	NO	PAINT	TEMP (DEG F)	INITIAL TEMP (DEG F)	SQUARE FOOT (HQUACAK)	TRAMITS)	BETA(10)
7442								
7434								
8068								
40100001								

UNITED STATES DEPARTMENT OF JUSTICE

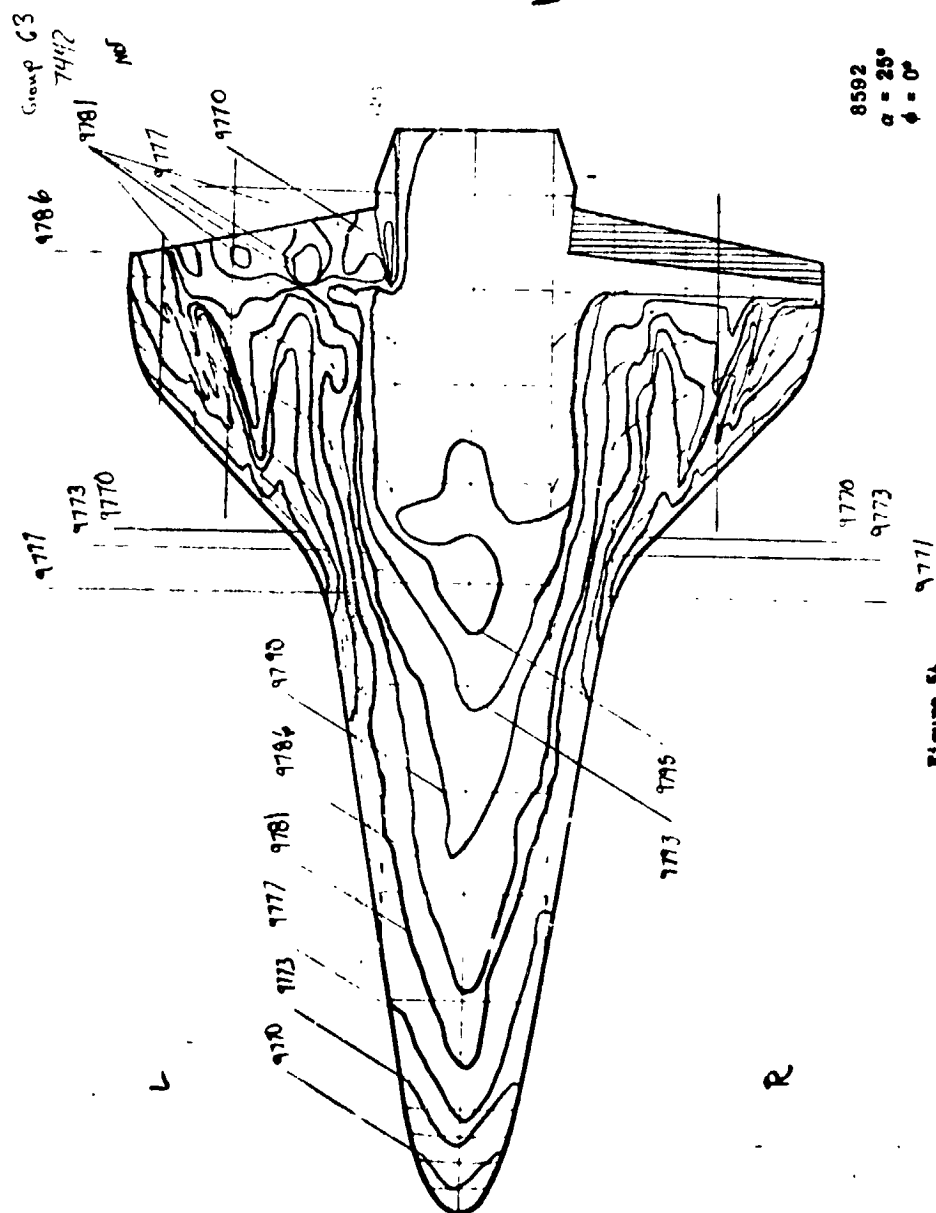


Group 63  
7434  
no



428

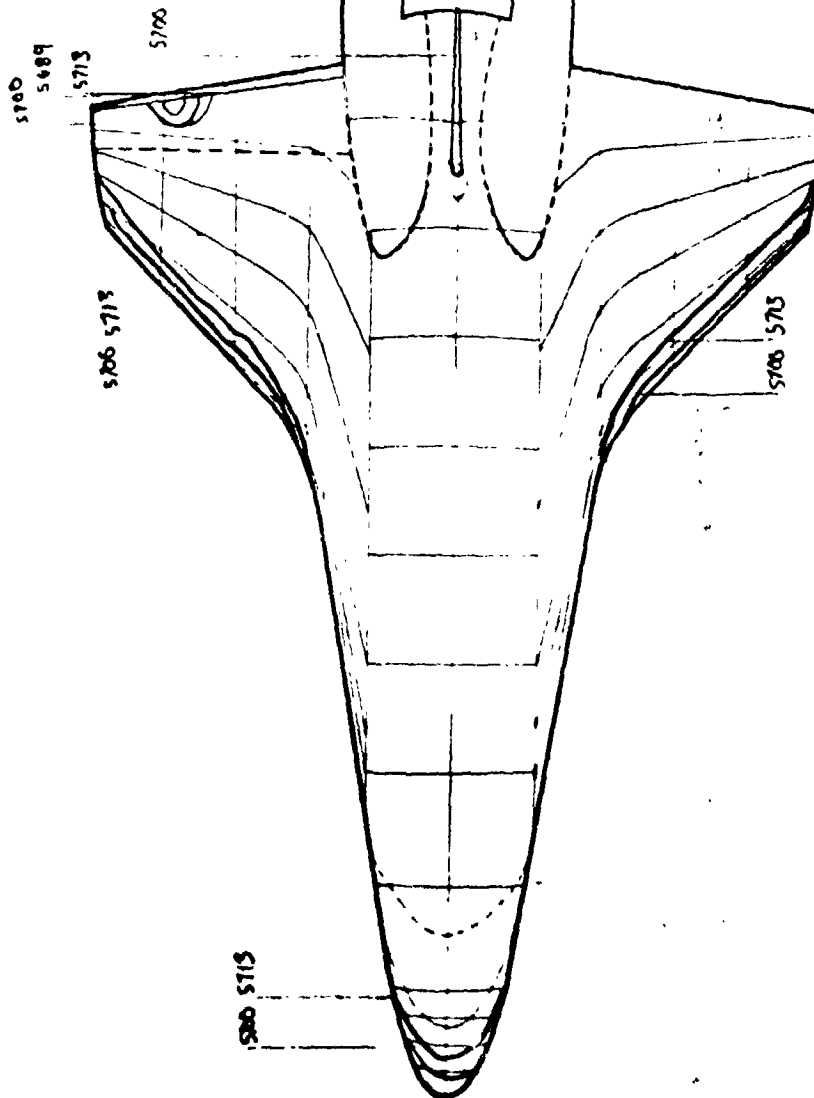
Figure 53



8592  
 $\alpha = 25^\circ$   
 $\phi = 0^\circ$

Group 63  
8468  
105

E Model



4525  
 $\alpha = 25^\circ$   
 $\phi = 0^\circ$

Figure 55

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7/ 9/73

NASA-R1 ORBITER HEATING

AEDC(ARO,INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL R

VA289

GROUP COMF16 MODEL MACH NO PO(P5IA) TO(DEC R) ALPHA-MODEL ALPHA-SECTION ALPHA-PREBEND ROLL-MODEL YAW  
 63 ORBITER E 7.91 111.1 1266 25.02 4.98 -30.00 -180.00 -0.00

T-INF P-INF Q-INF V-INF RMO-INF MU-INF RE/FT HREF STREF  
 (DEG R) (P5IA) (P5IA) (FI/SEC) (SLUGS/FI3) (LB-SEC/FI2) (FI-1) (H= .0175EI) (H= .0175EI)  
 93.7 .012 .516 3751 1.098E-05 7.542E-08 5.453E 05 1.700E-02 5.490E-02

CAMERA ROLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHOACK) TRAN(TOI) BETA(TOI)  
 TOP(TI) 7442 80 .0496 0 0  
 SIDE(SI) 7434  
 HOTTC(H) 8468

PIC NO	TIME RELTIME	Y(TOI)	M(TOI)/HREF	M(.9TO)	M(.9TO)/HREF	M(.902TO)	M(.902TO)/HREF	ST(TOI)
T 9768(150)	1.18	MODEL HAS NOT REACHED CENTERLINE						
S 3444(150)	1.18	MODEL HAS NOT REACHED CENTERLINE						
M 5686(150)	1.18	MODEL HAS NOT REACHED CENTERLINE						
T 9767(150)	2.23	MODEL HAS NOT REACHED CENTERLINE						
S 3445(150)	2.23	MODEL HAS NOT REACHED CENTERLINE						
M 5687(150)	2.23	MODEL HAS NOT REACHED CENTERLINE						
INJECT TIME = 2.28								
T 9770(150)	3.30	DATA NOT YET VALID						
S 3446(150)	3.30	DATA NOT YET VALID						
M 5688(150)	3.30	DATA NOT YET VALID						
T 9771(150)	4.34	2.605E-03	.1454	3.213E-03	.1793	3.198E-03	.1785	7.898E-03
S 3447(150)	4.34	2.605E-03	.1454	3.213E-03	.1793	3.198E-03	.1785	7.898E-03
M 5689(150)	4.34	2.605E-03	.1454	3.213E-03	.1793	3.198E-03	.1785	7.898E-03
T 9772(150)	5.43	2.251E-03	.1256	2.776E-03	.1540	2.764E-03	.1542	6.820E-03
S 3448(150)	5.43	2.245E-03	.1253	2.768E-03	.1545	2.756E-03	.1538	6.805E-03
M 5690(150)	5.43	2.245E-03	.1253	2.768E-03	.1545	2.756E-03	.1538	6.805E-03
T 9773(150)	6.51	2.006E-03	.1119	2.474E-03	.1380	2.463E-03	.1374	6.078E-03
S 3449(150)	6.51	2.006E-03	.1119	2.474E-03	.1380	2.463E-03	.1374	6.078E-03
M 5691(150)	6.51	2.006E-03	.1119	2.474E-03	.1380	2.463E-03	.1374	6.078E-03
T 9774(150)	7.58	1.831E-03	.1021	2.253E-03	.1259	2.248E-03	.1253	5.541E-03
S 3450(150)	7.58	1.827E-03	.1020	2.253E-03	.1258	2.243E-03	.1252	5.540E-03
M 5692(150)	7.58	1.827E-03	.1020	2.253E-03	.1258	2.243E-03	.1252	5.540E-03
T 9775(150)	8.63	1.692E-03	.0944	2.086E-03	.1164	2.077E-03	.1159	5.124E-03
S 3451(150)	8.63	1.692E-03	.0944	2.086E-03	.1164	2.077E-03	.1159	5.124E-03
M 5693(150)	8.63	1.692E-03	.0944	2.086E-03	.1164	2.077E-03	.1159	5.124E-03
T 9776(150)	9.71	1.540E-03	.0881	1.948E-03	.1086	1.940E-03	.1082	4.782E-03
S 3452(150)	9.71	1.530E-03	.0881	1.948E-03	.1086	1.940E-03	.1082	4.782E-03
M 5694(150)	9.71	1.540E-03	.0881	1.948E-03	.1086	1.940E-03	.1082	4.782E-03

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7/ 9/73

NASA-RI 1981TEN PEATING

AEDC(ARO,INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL R

VA289

GROUP CONFID MODEL MACH NO PROPSIA T0(DEG R) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREBEND ROLL-MODEL YAW  
 63 3 ORBITER E 7.91 111.8 1266 25.02 4.98 -30.00 -180.00 -0.00

T-INF P-INF Q-INF V-INF MU-INF RE/F1 MREF SREF  
 (DEG R) (PSIA) (FT/SEC) (SLUGS/FT3) (LB-SEC/FT2) (EJ-1) (R-0.175FI) (R-0.175FI)  
 93.7 .012 .540 3752 1.104E-05 7.545E-08 5.489E 05 1.796E-02 5.472E-02

CAMERA HOLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHOCXK) TRAR(TO) BETA(TO)

TOP(T) 7442  
 SIDE(S) 7434  
 BOTTOM(B) 8468

.0496

9.640E-02 9.2497E-02

PIC NO	TIME DELTIME	M(TO)	M(TO)/MREF	M(.910)	M(.910)/MREF	M(.902TO)	M(.902TO)/MREF	ST(TO)
T 9785(150)	19.32	1.040E-03	.0601	1.332E-03	.0742	1.326E-03	.0738	3.260E-03
S 3461(150)	19.32	1.080E-03	.0601	1.332E-03	.0742	1.326E-03	.0738	3.260E-03
M 5704(150)	19.32	1.050E-03	.0595	1.295E-03	.0721	1.289E-03	.0718	3.149E-03
T 9786(150)	20.40	1.049E-03	.0584	1.294E-03	.0720	1.288E-03	.0717	3.164E-03
S 3462(150)	20.40	1.049E-03	.0584	1.294E-03	.0720	1.288E-03	.0717	3.164E-03
T 9787(150)	21.45	1.022E-03	.0569	1.260E-03	.0701	1.254E-03	.0698	3.081E-03
S 3463(150)	21.45	1.022E-03	.0569	1.260E-03	.0701	1.254E-03	.0698	3.081E-03
M 5705(150)	21.47	1.021E-03	.0569	1.259E-03	.0701	1.253E-03	.0698	3.082E-03
T 9790(150)	21.75	9.838E-04	.0557	1.213E-03	.0675	1.208E-03	.0672	2.965E-03
S 3464(150)	21.75	9.838E-04	.0557	1.213E-03	.0675	1.208E-03	.0672	2.965E-03
T 9791(150)	23.05	9.832E-04	.0558	1.213E-03	.0675	1.207E-03	.0672	2.968E-03
S 3465(150)	23.05	9.832E-04	.0558	1.213E-03	.0675	1.207E-03	.0672	2.968E-03
M 5706(150)	23.08	9.404E-04	.0523	1.160E-03	.0645	1.155E-03	.0642	2.834E-03
T 9792(150)	25.08	9.404E-04	.0523	1.160E-03	.0645	1.155E-03	.0642	2.834E-03
S 3466(150)	25.08	9.404E-04	.0523	1.160E-03	.0645	1.155E-03	.0642	2.834E-03
M 5707(150)	27.11	9.027E-04	.0503	1.113E-03	.0620	1.108E-03	.0617	2.723E-03
T 9793(150)	27.11	9.027E-04	.0503	1.113E-03	.0620	1.108E-03	.0617	2.723E-03
S 3467(150)	27.13	9.023E-04	.0502	1.113E-03	.0619	1.104E-03	.0616	2.717E-03
M 5708(150)	27.13	9.023E-04	.0502	1.113E-03	.0619	1.104E-03	.0616	2.717E-03
T 9794(150)	29.13	8.643E-04	.0483	1.072E-03	.0596	1.067E-03	.0594	2.617E-03
S 3468(150)	29.13	8.643E-04	.0483	1.072E-03	.0596	1.067E-03	.0594	2.617E-03
M 5709(150)	29.16	8.640E-04	.0483	1.072E-03	.0596	1.067E-03	.0593	2.618E-03
T 9795(150)	31.16	8.343E-04	.0467	1.035E-03	.0575	1.030E-03	.0573	2.525E-03
S 3469(150)	31.16	8.343E-04	.0467	1.035E-03	.0575	1.030E-03	.0573	2.525E-03
M 5710(150)	31.19	8.340E-04	.0467	1.035E-03	.0576	1.030E-03	.0573	2.528E-03
T 9796(150)	31.19	8.340E-04	.0467	1.035E-03	.0576	1.030E-03	.0573	2.528E-03
S 3470(150)	33.21	8.119E-04	.0451	1.001E-03	.0557	9.967E-04	.0554	2.442E-03
M 5711(150)	33.21	8.119E-04	.0451	1.001E-03	.0557	9.967E-04	.0554	2.442E-03

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NASA-BI ORBITER PEATING AEDC(ARO,INC.) ARNOLD AFS, TENNESSEE  
VON KARMAN GAS DYNAMICS FACILITY  
50 INCH HYPERSONIC TUNNEL A

VA289

GROUP CNF16 MODEL MACH NO PO(PSIA) TO(DEG R) ALPHA-MODEL ALPHA-SECTION ALPHA-PREBEND ROLL-MODEL YAW  
61 3 GREITER E 7.91 112-1 1266 25.02 4.98 -30.00 -180.00 -.00  
T-INF P-INF O-INF V-INF MU-INF RHO-INF PR/FT MREF SINEF  
(DEG R) (PSIA) (FT/SEC) (SLUGS/FT<sup>3</sup>) (LBS-SEC/FT<sup>2</sup>) (FT-1) (LBS-0.175ET) (R=0.175ET)  
93.7 .012 .561 3752 1-107E-05 7.545E-08 5.504E 05 1.799E-02 5.465E-02  
CAMERA ROLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHOXCAK) THAR(10) BETA(10)  
TOP(1) 7442  
SIDE(5) 7434 150 .0496 9.640E-02 9.2497E-02  
HOLICH(8) 8468

PIC NO TIME DELTIME H(10) H(10)/HREF H(10) H(10)/HREF H(10) H(10)/HREF H(10) H(10)/HREF ST(10)  
T 9794(150) 35.24 32.96 7.873E-04 .0438 9.709E-04 .0540 9.665E-04 .0548 2.370E-03  
M 5712(150) 35.24 33.94 7.873E-04 .0438 9.709E-04 .0540 9.665E-04 .0538 2.370E-03  
S 3471(150) 35.27 33.99 7.870E-04 .0437 9.705E-04 .0539 9.661E-04 .0537 2.367E-03  
T 5713(150) 37.27 35.90 7.648E-04 .0425 9.431E-04 .0524 9.389E-04 .0522 2.300E-03  
M 9795(150) 37.29 36.01 7.645E-04 .0425 9.428E-04 .0524 9.385E-04 .0522 2.302E-03  
S 3471(150) 37.29 36.01 7.645E-04 .0425 9.428E-04 .0524 9.385E-04 .0522 2.302E-03  
MODEL HAS LEFT CENTERLINE  
T 9796(150) 39.32 38.04 7.438E-04 .0414 9.173E-04 .0510 9.132E-04 .0508 2.239E-03  
M 3472(150) 39.32 38.04 7.438E-04 .0414 9.173E-04 .0510 9.132E-04 .0508 2.239E-03  
S 5714(150) 39.32 38.04 7.438E-04 .0414 9.173E-04 .0510 9.132E-04 .0508 2.239E-03

283

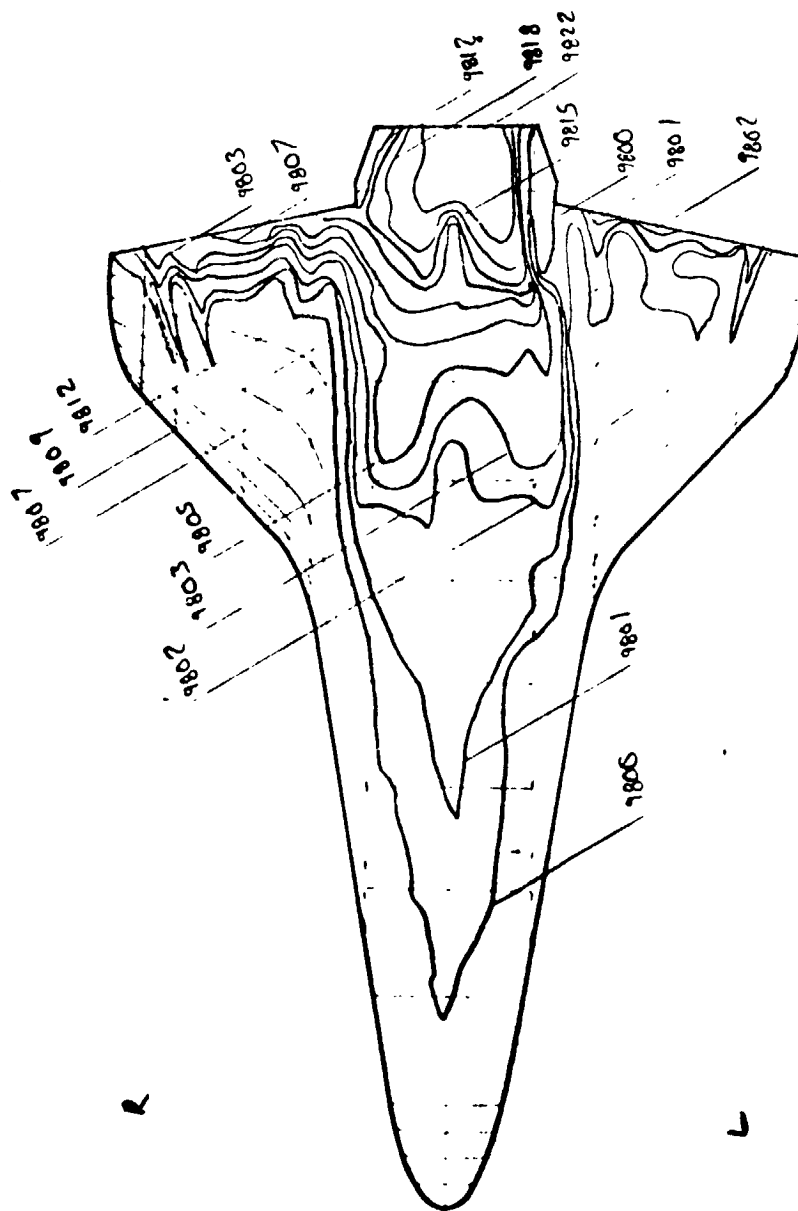
434

1





Group 64  
7442  
✓

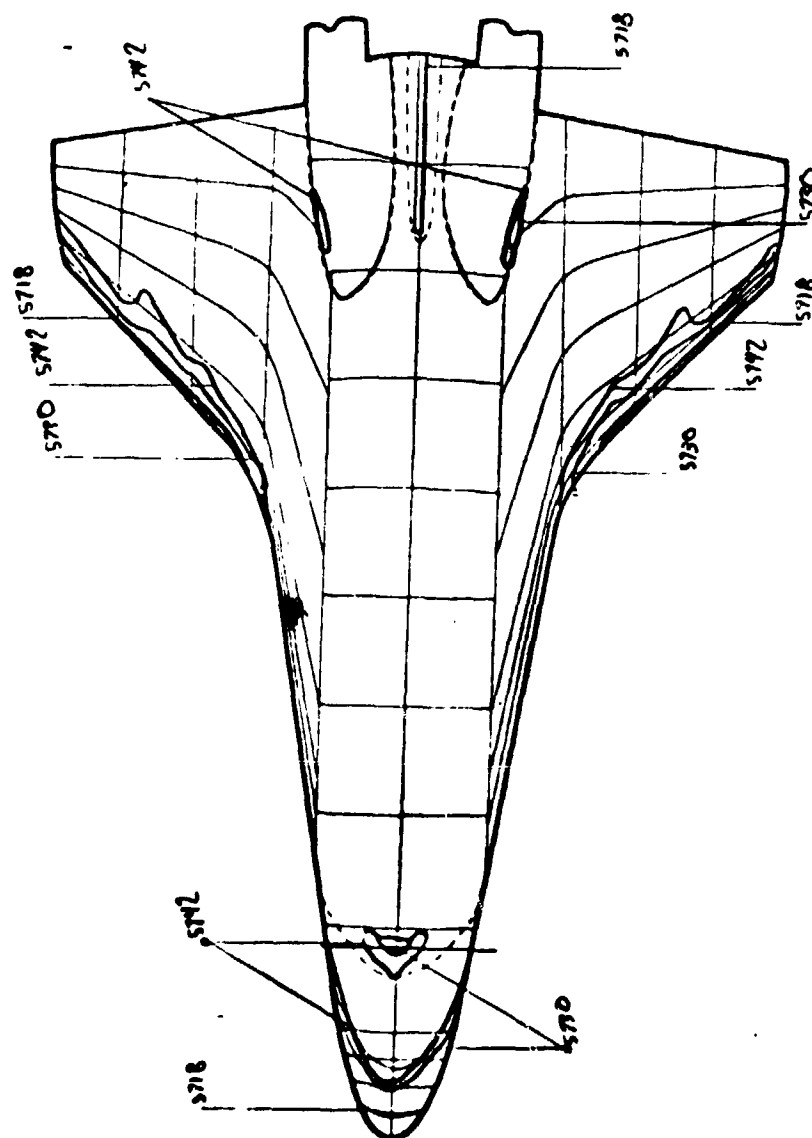


8592  
 $\alpha = 25^\circ$   
 $\phi = 0^\circ$

Figure 57

Group 64  
8/4/68

ms



4825  
 $\alpha = 25^\circ$   
 $\phi = 0^\circ$

Figure 58



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NASA-R1 ORBITER HEATING

AEDCIAMG-INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL A

VA299

GROUP CONFID MODEL MACH NO WIND(SIA) TO(DEV R) ALPHA-MODEL ALPHA-SECTION ALPHA-PREBEND ROLL-MODEL YAW  
 44 2 ORBITER S 7.91 110.5 1267 25.02 4.98 -30.00 -180.00 -0.00

T-INF P-INF U-INF V-INF W-INF MU-INF DE/FT MREF STREF  
 (DEG M) (PSIA) (FT/SEC) (SLUGS/FT3) (LM-SEC/FT2) (FT-1) (R= .0175FT) (R= .0175FT)  
 93.7 .012 .533 3753 1.000E-05 7.547E-08 5.419E-05 1.745E-02 5.508E-02

CAMERA ROLL NO PAINT IFHP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHOACAK) TRANSITO RETATO  
 TOP(1) 7442 113 79 .0475 4.612E-02 4.3001E-02  
 SIDE(S) 7434  
 BOTTOM(B) 8469

PIC NO	TIME	M(TO)	M(TO)/MREF	M(.9TO)	M(.9TO)/MREF	M(.92TO)	M(.92TO)/MREF	ST(10)
T 900411131	10.54	6.607E-04	.0370	6.445E-04	.0452	8.031E-04	.0450	2.024E-03
S 346211131	10.54	6.607E-04	.0370	6.445E-04	.0452	8.031E-04	.0450	2.024E-03
M 572411131	10.54	6.607E-04	.0370	6.445E-04	.0452	8.031E-04	.0450	2.024E-03
T 900711131	11.59	6.271E-04	.0351	7.656E-04	.0429	7.622E-04	.0427	1.919E-03
S 346311131	11.59	6.271E-04	.0351	7.656E-04	.0429	7.622E-04	.0427	1.919E-03
M 572511131	11.59	6.271E-04	.0351	7.656E-04	.0429	7.622E-04	.0427	1.919E-03
T 900811131	12.56	6.975E-04	.0335	7.247E-04	.0408	7.247E-04	.0406	1.827E-03
S 346411131	12.56	6.975E-04	.0335	7.247E-04	.0408	7.247E-04	.0406	1.827E-03
M 572611131	12.56	6.975E-04	.0335	7.247E-04	.0408	7.247E-04	.0406	1.827E-03
T 900911131	13.04	6.711E-04	.0320	6.901E-04	.0391	6.901E-04	.0389	1.748E-03
S 346511131	13.04	6.711E-04	.0320	6.901E-04	.0391	6.901E-04	.0389	1.748E-03
M 572711131	13.04	6.711E-04	.0320	6.901E-04	.0391	6.901E-04	.0389	1.748E-03
T 901011131	13.12	6.441E-04	.0304	6.704E-04	.0375	6.704E-04	.0374	1.681E-03
S 346611131	13.12	6.441E-04	.0304	6.704E-04	.0375	6.704E-04	.0374	1.681E-03
M 572811131	13.12	6.441E-04	.0304	6.704E-04	.0375	6.704E-04	.0374	1.681E-03
T 901111131	14.01	6.209E-04	.0286	6.457E-04	.0341	6.457E-04	.0340	1.616E-03
S 346711131	14.01	6.209E-04	.0286	6.457E-04	.0341	6.457E-04	.0340	1.616E-03
M 572911131	14.01	6.209E-04	.0286	6.457E-04	.0341	6.457E-04	.0340	1.616E-03
T 901211131	14.01	6.209E-04	.0286	6.457E-04	.0341	6.457E-04	.0340	1.616E-03
S 346811131	14.01	6.209E-04	.0286	6.457E-04	.0341	6.457E-04	.0340	1.616E-03
M 573011131	14.01	6.209E-04	.0286	6.457E-04	.0341	6.457E-04	.0340	1.616E-03
T 901311131	14.01	6.209E-04	.0286	6.457E-04	.0341	6.457E-04	.0340	1.616E-03
S 346911131	14.01	6.209E-04	.0286	6.457E-04	.0341	6.457E-04	.0340	1.616E-03
M 573111131	14.01	6.209E-04	.0286	6.457E-04	.0341	6.457E-04	.0340	1.616E-03
T 901411131	14.01	6.209E-04	.0286	6.457E-04	.0341	6.457E-04	.0340	1.616E-03
S 347011131	14.01	6.209E-04	.0286	6.457E-04	.0341	6.457E-04	.0340	1.616E-03
M 573211131	14.01	6.209E-04	.0286	6.457E-04	.0341	6.457E-04	.0340	1.616E-03

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AECC (ARGO, INC.) ARNOLD AFB, TENNESSEE  
VON KARMAN GAS DYNAMICS FACILITY  
50 INCH HYPERSONIC TUNNEL

50 INCH FIVE INCH TUBING

50 INCH FIVE INCH TUBING

Y-FAF	P-1-F	Q-1-F	V-INF	RMQ-INF	MU-INF	MF-FI	MRFF	STREF
(0514)	(0514)	(0514)	(E125C)	(SLUG/F13)	(LB-SLC/F12)	(E1-1)	1A	-0175F11
91.7	91.2	534	3752	1.091F-05	7.540F-0A	5.422	05	5.505E-02

**NOTES**

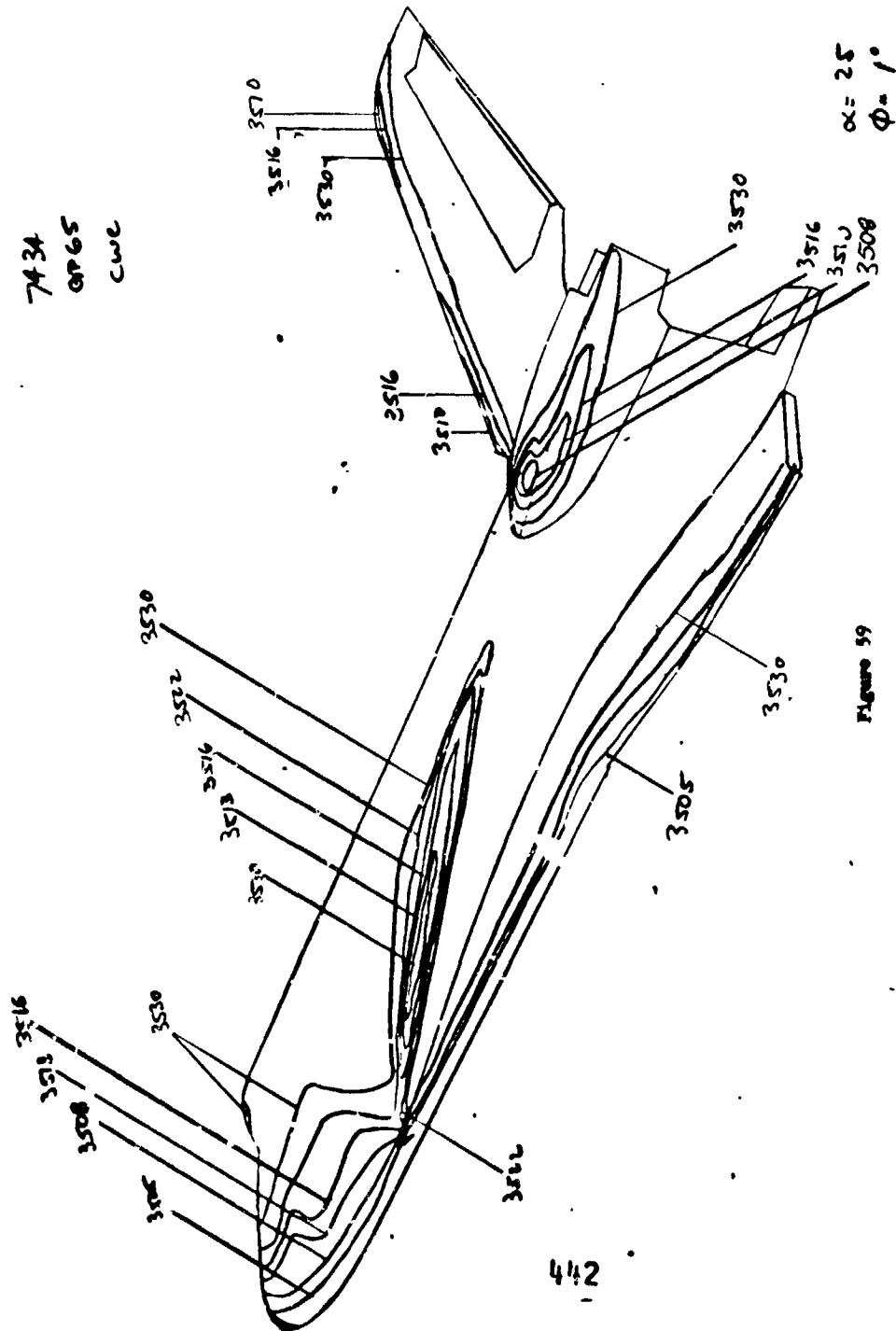
265

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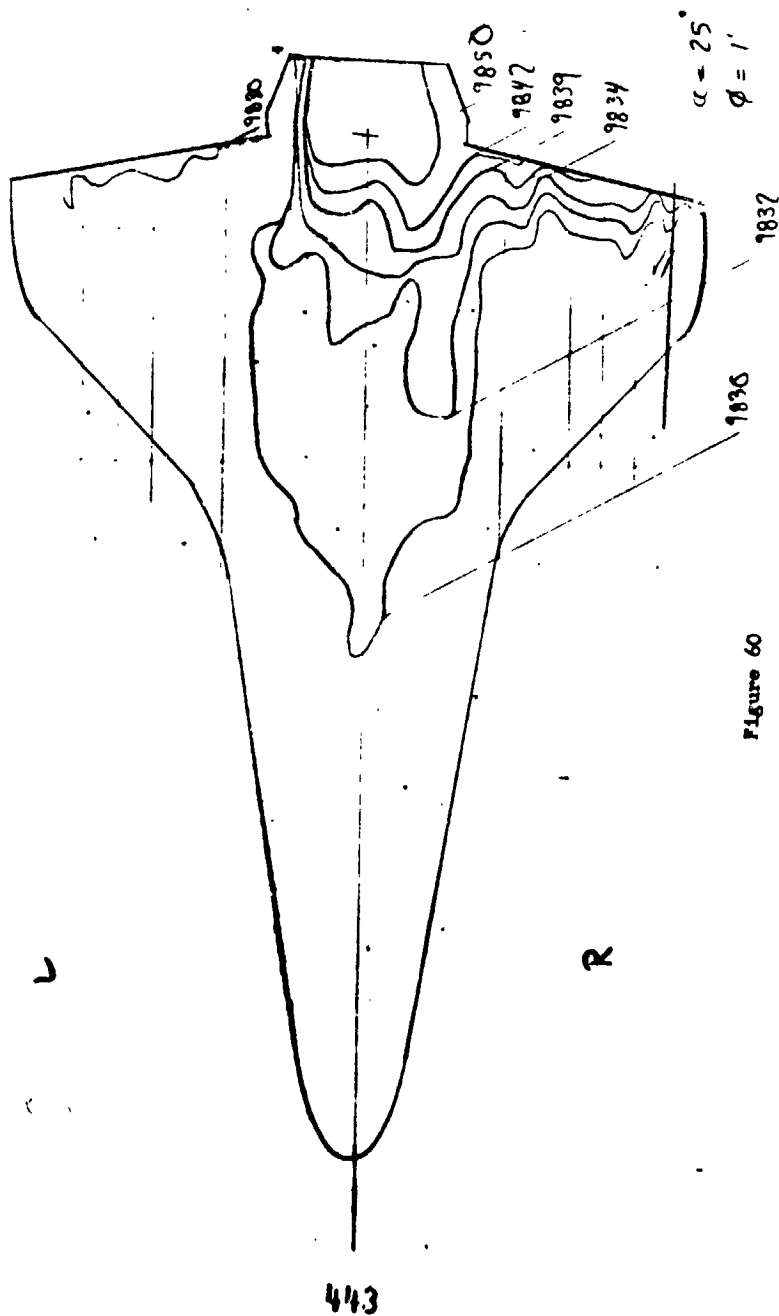
AFOCIAWO, INC.) ARNOLD AFS, TENNESSEE  
VOM KARMA GAS DYNAMICS FACILITY  
50 INCH HYPERSONIC TUNNEL A.

7/9/73

PIC NO	LINE	DELTYPE	M(TO)	M(TO)/WREF	M(1010)	M(1010)/WREF	M(1010)	M(1010)/WREF	M(1010)	ST(10)
0023(13)	35.04	37.74	3.515E-04	.0197	4.292E-04	.0240	4.273E-04	.0239	1.073E-03	
1600(11)	35.04	37.76	3.515E-04	.0197	4.292E-04	.0240	4.273E-04	.0239	1.073E-03	
0024(17)	37.07	37.70	3.14E-04	.0193	4.168E-04	.0233	4.150E-04	.0232	1.041E-03	
3500(11)	37.07	37.70	3.614E-04	.0191	4.168E-04	.0233	4.150E-04	.0232	1.041E-03	
5742(11)	37.07	37.70	3.614E-04	.0191	4.168E-04	.0233	4.150E-04	.0232	1.041E-03	
	37.07		MODEL WAS LEFT CENTRAL LINE							
0025(11)	39.00	37.02	3.322E-04	.0196	4.055E-04	.0227	4.038E-04	.0226	1.013E-03	
1601(11)	39.00	37.02	3.322E-04	.0196	4.055E-04	.0227	4.038E-04	.0226	1.013E-03	
0743(11)	39.00	37.02	3.322E-04	.0196	4.055E-04	.0227	4.038E-04	.0226	1.013E-03	
0026(11)	41.12	39.04	3.236E-04	.0191	3.951E-04	.0221	3.933E-04	.0220	9.868E-04	
5740(11)	41.12	39.04	3.236E-04	.0191	3.951E-04	.0221	3.933E-04	.0220	9.868E-04	
3502(11)	41.12	39.04	3.236E-04	.0191	3.951E-04	.0221	3.933E-04	.0220	9.868E-04	
				.0191	3.951E-04	.0221	3.933E-04	.0220	9.868E-04	



Group 65  
7442  
105





Group 65  
8468  
nd

$\alpha = 25$   
 $\phi = 1$

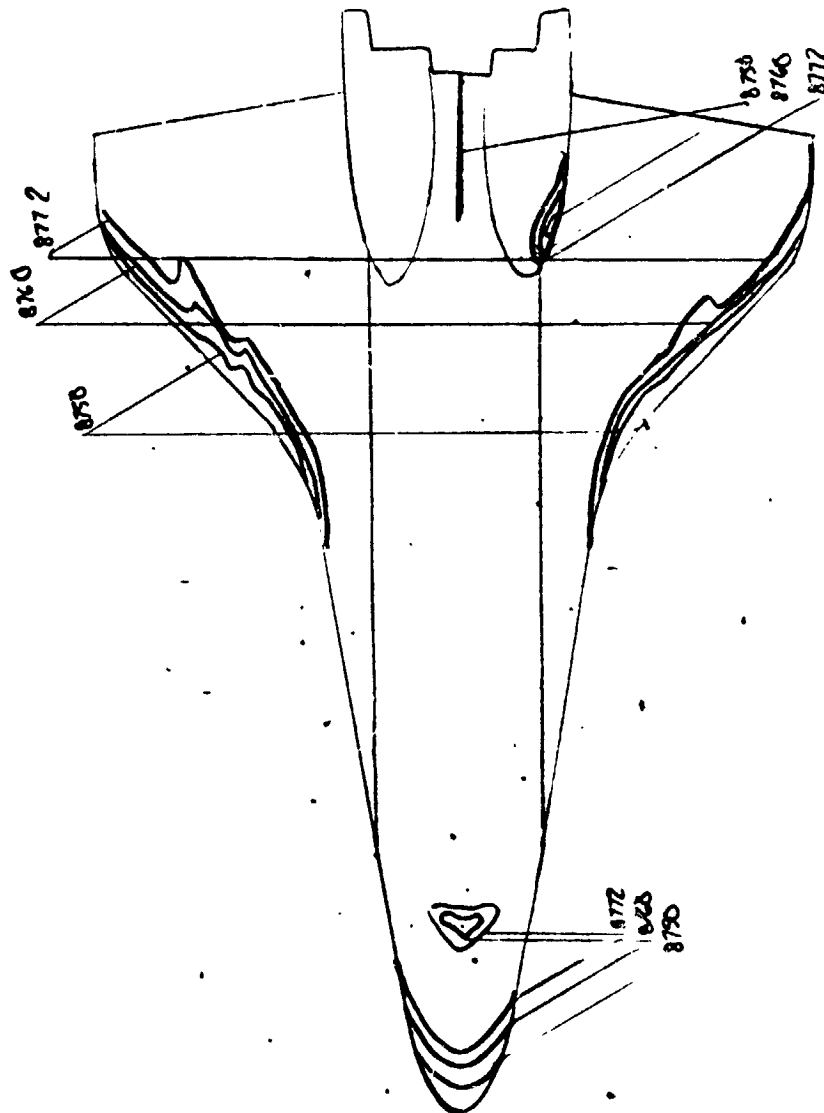


Figure 61

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NASA-31 ORBITER HEATING

AEDC(ARD, INC.) ARNOLD AFS, TENNESSEE  
VON KARMAN GAS DYNAMICS FACILITY  
50 INCH HYPERSONIC TUNNEL R

VAZ89

GROUP	CONFID	MODEL	MACH NO	W(PISA)	TO(DEC R)	ALPHA-MODEL	ALPHA-SECTION	ALPHA-PREBEND	RQLL-MODEL	YAM
65	2	ORBITER S	7.91	110.2	1267	25.00	4.98	-30.00	-182.40	1.01
T-INF	P-INF	Q-INF	V-INF	W-INF	MU-INF	RF/PI	HREF	STREF		
(DEC R)	(PSIA)	(FT/SEC)	(SLUGS/FT)	(LB-SEC/FT)	(FI-1)	(RZ-.0175E1)	(RZ-.0175E1)			
93.1	.012	.532	3754	1.046E-05	7.551E-08	5.400E-05	1.743E-02	5.517E-02		
CAMFRA	HOLL NO	PAINT ICMP	(DEC F)	INITIAL TEMP	(DEC F)	SQUARE ROOT	(RHOXCAK)	TRAR(ITO)	BETA(ITO)	
TOP(IT)	7442									
SIDE(S)	7434	113		90		.0475		0	0	
MOTION(M)	846H									

PIC NO	TIME DELTIME	H(ITO)	H(ITO)/HREF	H(.9TO)	H(.9TO)/HREF	H(.9TO)/HREF	ST(ITO)
T 9023(113)	1.15	MODEL HAS NOT REACHED CENTERLINE					
M 5745(113)	1.15	MODEL HAS NOT REACHED CENTERLINE					
S 3503(113)	1.15	MODEL HAS NOT REACHED CENTERLINE					
T 9024(113)	2.23	MODEL HAS NOT REACHED CENTERLINE					
M 5746(113)	2.23	MODEL HAS NOT REACHED CENTERLINE					
INJECT TIME = 2.25							
S 3504(113)	2.25	DATA NOT YET VALID					
T 9025(113)	3.30	DATA NOT YET VALID					
M 5747(113)	3.30	DATA NOT YET VALID					
S 3505(113)	3.33	DATA NOT YET VALID					
T 9030(113)	4.38	1.122E-03	.0628	1.370E-03	.0767	1.364E-03	.0763
M 5748(113)	4.38	1.122E-03	.0628	1.370E-03	.0767	1.364E-03	.0763
S 3506(113)	4.38	1.122E-03	.0628	1.370E-03	.0767	1.364E-03	.0763
T 9031(113)	5.43	9.700E-04	.0543	1.181E-03	.0661	1.176E-03	.0658
M 5749(113)	5.46	9.671E-04	.0542	1.181E-03	.0661	1.176E-03	.0658
S 3507(113)	5.46	9.671E-04	.0542	1.181E-03	.0661	1.176E-03	.0658
T 9032(113)	6.51	8.647E-04	.0484	1.056E-03	.0591	1.051E-03	.0588
M 5750(113)	6.51	8.647E-04	.0484	1.056E-03	.0591	1.051E-03	.0588
S 3508(113)	6.53	8.627E-04	.0483	1.053E-03	.0589	1.049E-03	.0587
T 9033(113)	7.58	7.877E-04	.0441	9.618E-04	.0538	9.574E-04	.0536
M 5751(113)	7.58	7.877E-04	.0441	9.618E-04	.0538	9.574E-04	.0536
S 3509(113)	7.58	7.877E-04	.0441	9.618E-04	.0538	9.574E-04	.0536
T 9034(113)	8.66	7.243E-04	.0403	8.905E-04	.0498	8.865E-04	.0495
M 5752(113)	8.66	7.243E-04	.0403	8.905E-04	.0498	8.865E-04	.0495
S 3510(113)	8.66	7.243E-04	.0403	8.905E-04	.0498	8.865E-04	.0495
T 9035(113)	9.71	6.813E-04	.0381	6.319E-04	.0465	6.281E-04	.0463
M 5753(113)	9.71	6.813E-04	.0381	6.319E-04	.0465	6.281E-04	.0463
S 3511(113)	9.71	6.813E-04	.0381	6.319E-04	.0465	6.281E-04	.0463

4-5

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UNCLASSIFIED  
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MEED (ARO, INC.) ARNOLD AFS, TENNESSEE  
VON KARMAN GAS DYNAMICS FACILITY  
50 INCH HYPERSONIC TUNNEL A

MA289  
MASSACHUSETTS

GROUP	CONFIG	MODEL	WALCH NO	PO (PSIA)	TO (DEG R)	ALPHA-MODEL	ALPHA-SECTION	ALPHA-PREBEND	ROLL-MODEL	YAW
05	2	CRIETEN S	7.91	110.8	1267	25.00	4.9R	-30.00	-182.00	1.01

T-1AF	P-1NF	U-1NF	V-1NF	W-1NF	MU-1NF	RF-1F	MF-1F	ST-1F
106G M <sub>1</sub>	(PCL)	(PCL)	(FT/SEC)	(SLUGS/FT)	1.2-SEC/FT2	(F-1)	(P=	(=
93.9	.712	.535	3754	1.032E-05	5.429E-08	5.429E 05	1.748E-02	5.502E-02

CAMERA	ROLL NO	PAINT TEMP (DEG F)	INITIAL TEMP (DEG F)	SQUARE ROOT (MMOXCXK)	TRAR(TO)	BETA(TO)
TOP (T)	7447					
SIDE (D)	7434	113	80	.00175	4.538E-02	4.1685E-02

PIC NO	TIME	DELTIME	M(T0)	M(T0)/HREF	M(.9T0)	M(.9T0)/HREF	M(.902T0)	M(.902T0)/HREF	ST(I0)
3511(113)	5.74	8.47	6.803E-04	.0390	8.306E-04	.0445	8.269E-04	.0463	2.077E-03
3512(113)	10.19	9.52	6.416E-04	.0350	7.834E-04	.0434	7.799E-04	.0436	1.959E-03
3513(113)	15.19	9.52	6.416E-04	.0350	7.834E-04	.0434	7.799E-04	.0436	1.959E-03
3514(113)	10.79	9.52	6.416E-04	.0350	7.834E-04	.0434	7.799E-04	.0436	1.959E-03
3515(113)	11.84	10.57	6.409E-04	.0340	7.435E-04	.0418	7.401E-04	.0414	1.857E-03
3516(113)	11.86	17.61	6.402E-04	.0340	7.428E-04	.0415	7.393E-04	.0413	1.854E-03
3517(113)	11.84	10.66	6.402E-04	.0340	7.428E-04	.0415	7.393E-04	.0413	1.854E-03
3518(113)	12.51	11.66	5.801E-04	.0324	7.088E-04	.0396	7.051E-04	.0394	1.768E-03
3519(113)	17.54	11.64	5.795E-04	.0324	7.076E-04	.0396	7.044E-04	.0394	1.768E-03
3520(113)	12.54	11.64	5.795E-04	.0324	7.076E-04	.0396	7.044E-04	.0394	1.768E-03
3521(113)	13.59	12.73	5.505E-04	.0310	6.777E-04	.0379	6.747E-04	.0377	1.694E-03
3522(113)	13.59	12.73	5.505E-04	.0310	6.777E-04	.0379	6.747E-04	.0377	1.694E-03
3523(113)	14.02	12.75	5.505E-04	.0310	6.776E-04	.0378	6.740E-04	.0377	1.690E-03
3524(113)	15.07	13.88	5.330E-04	.0294	6.507E-04	.0363	6.478E-04	.0362	1.623E-03
3525(113)	15.07	13.88	5.330E-04	.0294	6.507E-04	.0363	6.478E-04	.0362	1.623E-03
3526(113)	15.07	13.88	5.330E-04	.0294	6.507E-04	.0363	6.478E-04	.0362	1.623E-03
3527(113)	15.12	14.88	5.133E-04	.0287	6.273E-04	.0350	6.245E-04	.0349	1.564E-03
3528(113)	15.14	14.88	5.133E-04	.0287	6.264E-04	.0350	6.239E-04	.0349	1.564E-03
3529(113)	17.19	15.93	4.941E-04	.0277	6.057E-04	.0338	6.030E-04	.0337	1.509E-03
3530(113)	17.22	15.96	4.937E-04	.0277	6.053E-04	.0338	6.025E-04	.0336	1.508E-03
3531(113)	17.22	15.96	4.937E-04	.0277	6.053E-04	.0338	6.025E-04	.0336	1.508E-03
3532(113)	19.27	17.01	4.801E-04	.0268	5.863E-04	.0327	5.836E-04	.0326	1.459E-03
3533(113)	15.27	17.01	4.811E-04	.0268	5.863E-04	.0327	5.836E-04	.0326	1.459E-03
3534(113)	15.27	17.01	4.811E-04	.0268	5.863E-04	.0327	5.836E-04	.0326	1.459E-03
3535(113)	15.27	17.01	4.811E-04	.0268	5.863E-04	.0327	5.836E-04	.0326	1.459E-03

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NASA-R1 ORBITER HEATING

VA209

AEDC(ARO-INC.) ARNOLD AFS, TENNESSEE  
VON KARMAN GAS DYNAMICS FACILITY  
50 INCH HYPERSONIC TUNNEL R

GROUP	COMPETE	MODEL	MACH NO	PO(PSTIA)	T0(DEG R)	ALPHA-MODEL	ALPHA-SECTION	ALPHA-PREPEND	ROLL-MODEL	YAW
65	2	ONEITEM S	7.91	111.1	1267	25.00	4.98	-30.00	-182.40	1.01
T-INF	P-INF	O-INF	V-INF	RHO-INF	MU-INF	HE/FT	MREF	SIREF		
(DEG R)	(PSIA)	(FT/SEC)	(SLUGS/FT3)	(LBS-SEC/FT2)	(FT-1)	(R= .0175E1)	(R= .0175E1)			
93.8	.012	.537	3754	1.006E-05	7.551E-08	5.449E 05	1.791E-02	5.492E-02		
CAMERA	ROLL NO	PAINT IFMP	(DEG F)	INITIAL TEMP	(DEG F)	SQUARE ROOT (RHO/CAX)	TRAN(TO)	BETA(TO)		
TOP(T)	7442									
SICF(S)	7434									
MOTOMIB)	8488									

PIC NO	TIME DELTIME	M(TO)	M(TO)/MREF	M(.910)	M(.910)/MREF	M(.90210)	M(.90210)/MREF	ST(TO)
T 484(113)	19.35	18.08	4.656E-04	5.685E-04	.0260	5.660E-04	.0316	1.417E-03
S 3520(113)	19.35	18.08	4.656E-04	5.685E-04	.0260	5.660E-04	.0316	1.417E-03
M 5162(113)	19.35	18.08	4.656E-04	5.685E-04	.0260	5.660E-04	.0316	1.417E-03
T 945(113)	20.42	19.14	4.524E-04	5.523E-04	.0252	5.498E-04	.0307	1.375E-03
S 3521(113)	20.42	19.14	4.524E-04	5.523E-04	.0252	5.498E-04	.0307	1.375E-03
M 5743(113)	20.42	19.14	4.524E-04	5.523E-04	.0252	5.498E-04	.0307	1.375E-03
T 9446(113)	21.50	20.24	4.402E-04	5.315E-04	.0246	5.350E-04	.0298	1.337E-03
S 3522(113)	21.50	20.24	4.402E-04	5.315E-04	.0246	5.350E-04	.0298	1.337E-03
M 5744(113)	21.50	20.24	4.402E-04	5.315E-04	.0246	5.350E-04	.0298	1.337E-03
T 9447(113)	22.58	21.31	4.242E-04	5.240E-04	.0239	5.217E-04	.0291	1.302E-03
S 3523(113)	22.58	21.31	4.242E-04	5.240E-04	.0239	5.217E-04	.0291	1.302E-03
M 5745(113)	22.58	21.31	4.242E-04	5.240E-04	.0239	5.217E-04	.0291	1.302E-03
T 9448(113)	24.45	23.19	4.112E-04	5.021E-04	.0229	4.998E-04	.0279	1.248E-03
S 3524(113)	24.45	23.19	4.112E-04	5.021E-04	.0229	4.998E-04	.0279	1.248E-03
M 5746(113)	24.45	23.19	4.112E-04	5.021E-04	.0229	4.998E-04	.0279	1.248E-03
T 9449(113)	26.49	25.22	3.943E-04	4.815E-04	.0220	4.793E-04	.0267	1.198E-03
S 3525(113)	26.49	25.22	3.943E-04	4.815E-04	.0220	4.793E-04	.0267	1.198E-03
M 5747(113)	26.49	25.22	3.943E-04	4.815E-04	.0220	4.793E-04	.0267	1.198E-03
T 9450(113)	28.51	27.24	3.744E-04	4.632E-04	.0211	4.611E-04	.0257	1.148E-03
S 3526(113)	28.51	27.24	3.744E-04	4.632E-04	.0211	4.609E-04	.0257	1.148E-03
M 5748(113)	28.51	27.24	3.744E-04	4.632E-04	.0211	4.609E-04	.0257	1.148E-03
T 9451(113)	30.56	29.30	3.648E-04	4.467E-04	.0204	4.447E-04	.0248	1.108E-03
S 3527(113)	30.56	29.30	3.648E-04	4.467E-04	.0204	4.447E-04	.0248	1.108E-03
M 5749(113)	30.56	29.30	3.648E-04	4.467E-04	.0204	4.447E-04	.0248	1.108E-03
T 9452(113)	32.59	31.32	3.538E-04	4.320E-04	.0197	4.300E-04	.0239	1.071E-03
S 3528(113)	32.59	31.32	3.538E-04	4.320E-04	.0197	4.300E-04	.0239	1.071E-03
M 5750(113)	32.59	31.32	3.538E-04	4.320E-04	.0197	4.300E-04	.0239	1.071E-03

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AEDC(ARO,INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNN. R

NASA-HI ORBITER HEATING

VA289

GROUP	CONFID	MODEL	MACH NO	PO(PSTA)	TO(CEG R)	ALPHA-MODEL	ALPHA-SECTOR	ALPHA-PREBEND	ROLL-MODEL	YAW
AS	2	ORBITER S	7.91	111.7	1267	25.00	4.9R	-30.00	-182.40	1.01
T-INF	P-INF	Q-INF	V-INF	RHO-INF	MU-INF	HF/FT	HRFF	SIREF		
(DEG R)	STAI	(FT/SEC)	(FT/SEC)	(SLUGS/FT <sup>3</sup> )	(LH-SEC/FT <sup>2</sup> )	(FT-1)	(R <sup>2</sup> .0175FT)	(H <sup>2</sup> .0175FT)		
93.8	.012	.540	3754	1.102E-05	7.551E-08	5.477E 05	1.795E-02	5.477E-02		
CAMERA	HOLL NO	PAINT (DEG F)	INITIAL TEMP (DEG F)	SQUARE ROOT (RHOXCAR)	TBAR(10)	RETA(10)				
TOP(1)	7442		80	.0475	4.538E-02	4.1685E-02				
SIN(15)	7434									
MOTICM(8)	8458									

PIC NO	TIME DELTIME	H(10)	H(10)/HREF	H(10)	H(10)/HREF	H(10)	H(10)/HREF	ST(10)
T 9853(113)	34.61	3.429E-04	.0191	4.186E-04	.0233	4.168E-04	.0232	1.037E-03
M 5771(113)	34.61	3.429E-04	.0191	4.186E-04	.0233	4.168E-04	.0232	1.037E-03
S 3529(113)	34.64	3.427E-04	.0191	4.185E-04	.0233	4.166E-04	.0232	1.036E-03
M 5772(113)	36.64	3.329E-04	.0185	4.045E-04	.0226	4.045E-04	.0225	1.006E-03
T 4854(113)	36.67	3.328E-04	.0185	4.043E-04	.0226	4.045E-04	.0225	1.007E-03
S 3530(113)	36.67	3.328E-04	.0185	4.043E-04	.0226	4.045E-04	.0225	1.007E-03
MODEL WAS LEFT CENTERLINE								
T 9855(113)	36.69	3.216E-04	.0180	3.952E-04	.0220	3.934E-04	.0219	9.776E-04
S 3531(113)	36.69	3.216E-04	.0180	3.952E-04	.0220	3.934E-04	.0219	9.776E-04
M 5773(113)	38.69	3.216E-04	.0180	3.952E-04	.0220	3.934E-04	.0219	9.776E-04
T 9856(113)	40.72	3.152E-04	.0175	3.849E-04	.0214	3.832E-04	.0213	9.521E-04
S 3532(113)	40.72	3.152E-04	.0175	3.849E-04	.0214	3.832E-04	.0213	9.521E-04
M 5774(113)	40.72	3.152E-04	.0175	3.849E-04	.0214	3.832E-04	.0213	9.521E-04
T 9857(113)	46.50	2.944E-04	.0175	3.644E-04	.0214	3.626E-04	.0213	9.311E-04

271

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7442  
6866  
CWC

8595  
 $\sigma = 30^\circ$   
 $\phi = 0^\circ$

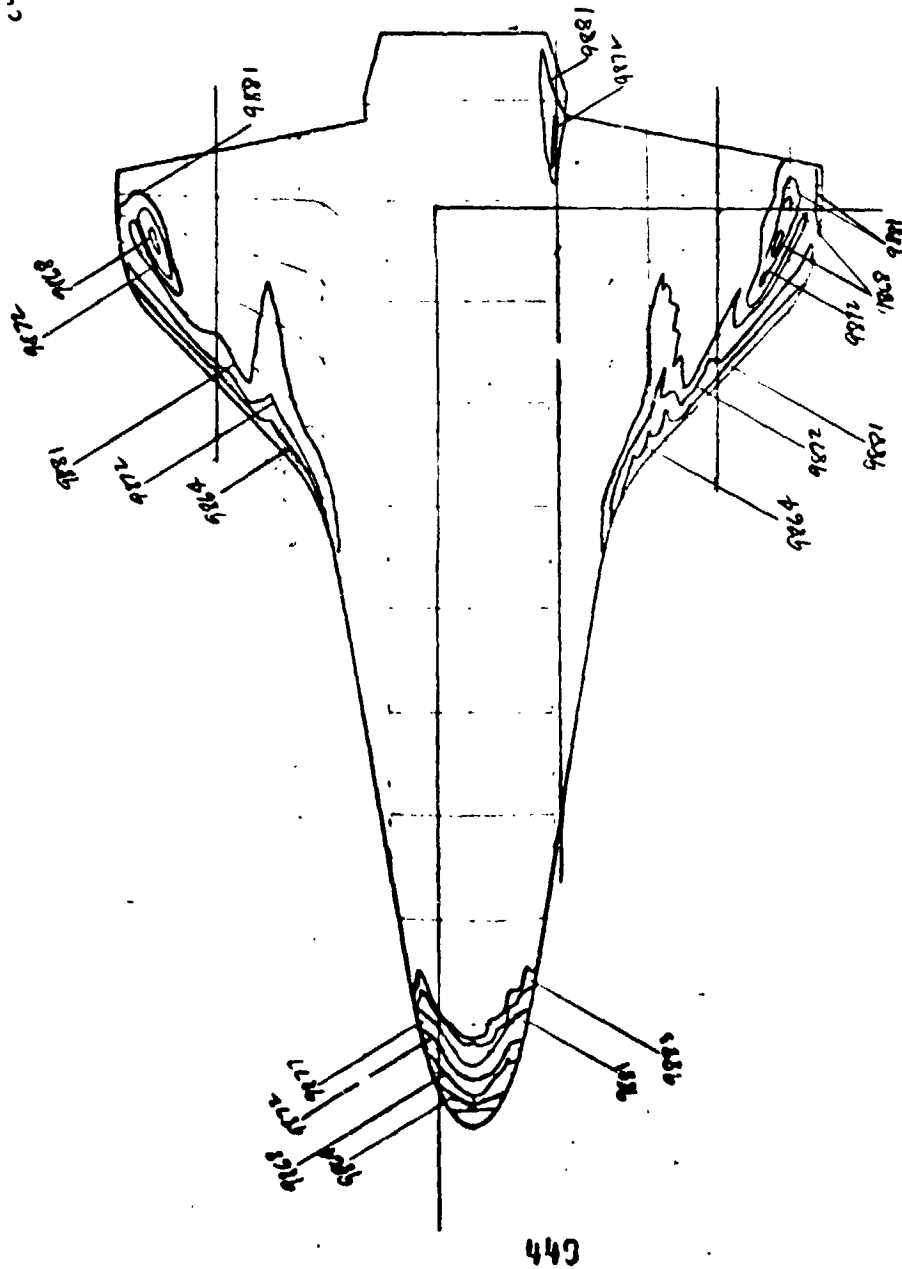


Figure 62

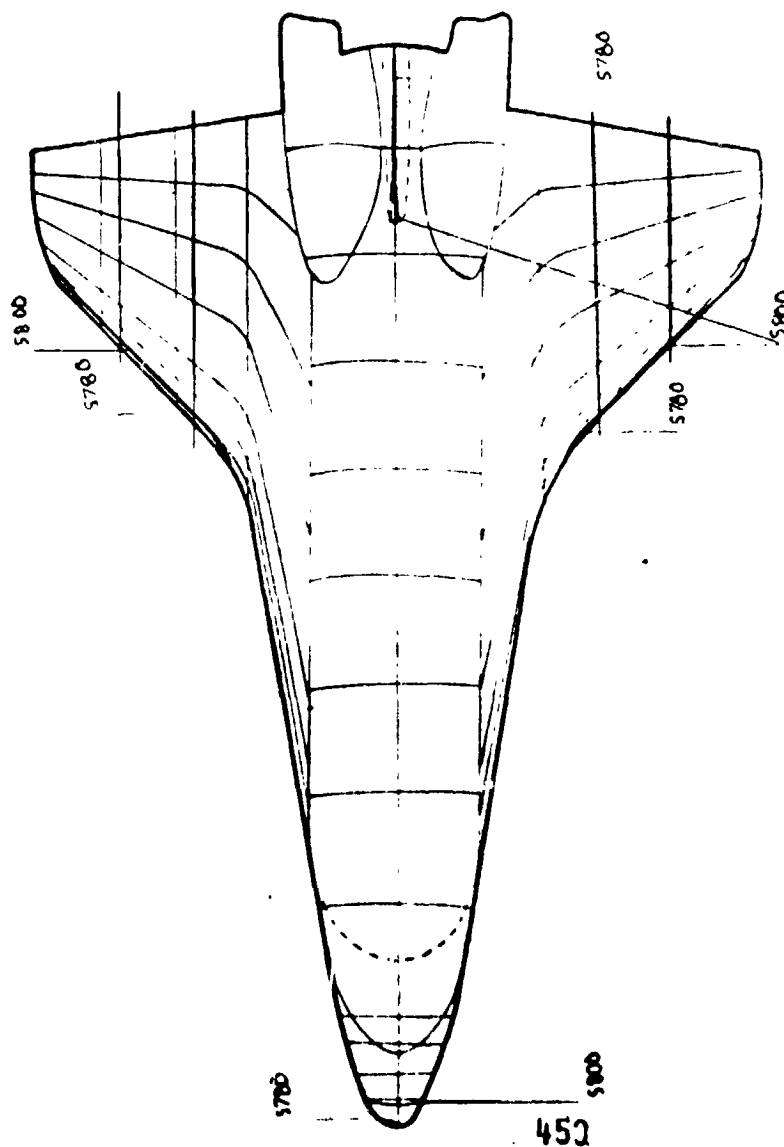


Figure 63

Comp 66  
8468  
16

4528  
 $\alpha = 30^\circ$   
 $\phi = 0^\circ$

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AEDC(ARNO)JAC-1 ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMIC FACILITY  
 50 INCH HYPERSONIC TUNNEL R

NASA-R1 ORBITER HEATING

VA289

GROUP	CONFID	MODEL	MACH NO	PT(PSIA)	TO(DEG R)	ALPHA-MODEL	ALPHA-SECTION	ALPHA-PREBEND	ROLL-MODEL	YAW
66	2	ORBITER B2	7.95	210.8	1284	30.01	-0.01	-30.00	-180.00	-0.00

T-INF	P-INF	U-INF	V-INF	W-INF	R-INF	MU-INF	R-FT	HREF	STREF
(DEG R)	(PSIA)	(FT/SEC)	(FT/SEC)	(SLUGS/FT <sup>2</sup> )	(LBS-SEC/FT <sup>2</sup> )	(LBS-SEC/FT <sup>2</sup> )	(LBS-SEC/FT <sup>2</sup> )	(LBS-SEC/FT <sup>2</sup> )	(LBS-SEC/FT <sup>2</sup> )
94.1	0.022	0.945	3770	2.005E-05	7.579E-08	9.997E-05	2.445E-02	0.066E-02	0.0175E1

CAMERA	ROLL NO	PAINT TEMP (DEG F)	INITIAL TEMP (DEG F)	SQUARE HUNT (RHOACAK)	TRAR(TO)	BETA(TO)
TOP(1)	7442					
SIDE(S)	7434	300	80	0.0544	0	0
WOTCM(8)	8468					

PTC NO	TIME DELT	H(TO)	H(TO)/HREF	H(.910)	H(.910)/HREF	H(.912TO)	H(.912TO)/HREF	ST(TO)
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T 9457(100)	1.18	MODEL WAS NOT REACHED CENTERLINE						
S 3533(100)	1.18	MODEL WAS NOT REACHED CENTERLINE						
M 5731(100)	1.18	MODEL WAS NOT REACHED CENTERLINE						
T 9458(100)	2.25	MODEL WAS NOT REACHED CENTERLINE						
S 3534(100)	2.25	MODEL WAS NOT REACHED CENTERLINE						
M 5776(100)	2.25	MODEL WAS NOT REACHED CENTERLINE						

INJECT TIME = 2.24

DATA NOT YET VALID

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7/ 9/73

AEDC-ARO-INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL W

NASA-R1 ORBITER HEATING

VA280

GROUP CONFIG MODEL MACH NO POISSIA T0(DEG R) ALPHA-MODEL ALPHA-SECTION ALPHA-PREBEND ROLL-MODEL YAW

66 2 CRITER R2 7.95 211.8 1284 30.01 -0.01 -30.06 -180.00 -0.00

T-INF P-INF Q-INF V-INF RHO-INF MU-INF RF/FT MREF SINEF

(DEG F) (PSIA) (FT/SEC) (SLUGS/FT3) (LB-SEC/FT2) (EI-1) (R= .0175FT) (R= .0175FT)

94.2 .023 1.000 3780 2.014E-05 7.581E-04 1.004E 06 2.450E-02 4.057E-02

CAMERA ROLL MU PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHOCACX) TBAR(TO) BETAITO)

FOPII 7442 300 .0544 2.957E-01 3.4553E-01

NIP(15) 7434

MOV(100) 8.559

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PIC NO	TIME RELTIME	M(TO)	H(TO)/MREF	M(.910)/MREF	M(.9120)/MREF	ST(TO)
1	3541(100)	9.79	8.51	6.444E-03	8.378E-03	1.048E-02
2	3542(100)	10.84	9.54	6.009E-03	7.904E-03	9.882E-03
3	3543(100)	10.84	9.54	6.009E-03	7.904E-03	9.882E-03
4	3544(100)	10.84	9.54	6.009E-03	7.904E-03	9.882E-03
5	3545(100)	10.84	9.54	6.009E-03	7.904E-03	9.882E-03
6	3546(100)	10.84	9.54	6.009E-03	7.904E-03	9.882E-03
7	3547(100)	10.84	9.54	6.009E-03	7.904E-03	9.882E-03
8	3548(100)	10.84	9.54	6.009E-03	7.904E-03	9.882E-03
9	3549(100)	10.84	9.54	6.009E-03	7.904E-03	9.882E-03
10	3550(100)	10.84	9.54	6.009E-03	7.904E-03	9.882E-03
11	3551(100)	10.84	9.54	6.009E-03	7.904E-03	9.882E-03
12	3552(100)	10.84	9.54	6.009E-03	7.904E-03	9.882E-03
13	3553(100)	10.84	9.54	6.009E-03	7.904E-03	9.882E-03
14	3554(100)	10.84	9.54	6.009E-03	7.904E-03	9.882E-03
15	3555(100)	10.84	9.54	6.009E-03	7.904E-03	9.882E-03
16	3556(100)	10.84	9.54	6.009E-03	7.904E-03	9.882E-03
17	3557(100)	10.84	9.54	6.009E-03	7.904E-03	9.882E-03
18	3558(100)	10.84	9.54	6.009E-03	7.904E-03	9.882E-03
19	3559(100)	10.84	9.54	6.009E-03	7.904E-03	9.882E-03
20	3560(100)	10.84	9.54	6.009E-03	7.904E-03	9.882E-03
21	3561(100)	10.84	9.54	6.009E-03	7.904E-03	9.882E-03
22	3562(100)	10.84	9.54	6.009E-03	7.904E-03	9.882E-03
23	3563(100)	10.84	9.54	6.009E-03	7.904E-03	9.882E-03
24	3564(100)	10.84	9.54	6.009E-03	7.904E-03	9.882E-03
25	3565(100)	10.84	9.54	6.009E-03	7.904E-03	9.882E-03
26	3566(100)	10.84	9.54	6.009E-03	7.904E-03	9.882E-03
27	3567(100)	10.84	9.54	6.009E-03	7.904E-03	9.882E-03
28	3568(100)	10.84	9.54	6.009E-03	7.904E-03	9.882E-03
29	3569(100)	10.84	9.54	6.009E-03	7.904E-03	9.882E-03
30	3570(100)	10.84	9.54	6.009E-03	7.904E-03	9.882E-03
31	3571(100)	10.84	9.54	6.009E-03	7.904E-03	9.882E-03
32	3572(100)	10.84	9.54	6.009E-03	7.904E-03	9.882E-03
33	3573(100)	10.84	9.54	6.009E-03	7.904E-03	9.882E-03
34	3574(100)	10.84	9.54	6.009E-03	7.904E-03	9.882E-03
35	3575(100)	10.84	9.54	6.009E-03	7.904E-03	9.882E-03
36	3576(100)	10.84	9.54	6.009E-03	7.904E-03	9.882E-03
37	3577(100)	10.84	9.54	6.009E-03	7.904E-03	9.882E-03
38	3578(100)	10.84	9.54	6.009E-03	7.904E-03	9.882E-03
39	3579(100)	10.84	9.54	6.009E-03	7.904E-03	9.882E-03
40	3580(100)	10.84	9.54	6.009E-03	7.904E-03	9.882E-03
41	3581(100)	10.84	9.54	6.009E-03	7.904E-03	9.882E-03
42	3582(100)	10.84	9.54	6.009E-03	7.904E-03	9.882E-03
43	3583(100)	10.84	9.54	6.009E-03	7.904E-03	9.882E-03
44	3584(100)	10.84	9.54	6.009E-03	7.904E-03	9.882E-03
45	3585(100)	10.84	9.54	6.009E-03	7.904E-03	9.882E-03
46	3586(100)	10.84	9.54	6.009E-03	7.904E-03	9.882E-03
47	3587(100)	10.84	9.54	6.009E-03	7.904E-03	9.882E-03
48	3588(100)	10.84	9.54	6.009E-03	7.904E-03	9.882E-03
49	3589(100)	10.84	9.54	6.009E-03	7.904E-03	9.882E-03
50	3590(100)	10.84	9.54	6.009E-03	7.904E-03	9.882E-03
51	3591(100)	10.84	9.54	6.009E-03	7.904E-03	9.882E-03
52	3592(100)	10.84	9.54	6.009E-03	7.904E-03	9.882E-03
53	3593(100)	10.84	9.54	6.009E-03	7.904E-03	9.882E-03
54	3594(100)	10.84	9.54	6.009E-03	7.904E-03	9.882E-03
55	3595(100)	10.84	9.54	6.009E-03	7.904E-03	9.882E-03
56	3596(100)	10.84	9.54	6.009E-03	7.904E-03	9.882E-03
57	3597(100)	10.84	9.54	6.009E-03	7.904E-03	9.882E-03
58	3598(100)	10.84	9.54	6.009E-03	7.904E-03	9.882E-03
59	3599(100)	10.84	9.54	6.009E-03	7.904E-03	9.882E-03
60	3600(100)	10.84	9.54	6.009E-03	7.904E-03	9.882E-03

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NASA-RI ORBITER PEATING

VA209

AEDC(AQ-1A) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 56 INCH HYPERSONIC TUNNEL A

GROUP CONFIC MODEL MACH NO PO(PSTA) TO(DEL R) ALPHA-MODEL ALPHA-SECTION ALPHA-PREBEND ROLL-MODEL YAW  
 64 2 ORBITER B2 7.95 2.2.7 1284 30.01 -.01 -30.00 -180.00 -.00

T-1AF P-1NF Q-1NF R-1NF S-1NF U-1NF V-1NF W-1NF X-1NF Y-1NF Z-1NF  
 (DEG M) (PSIA) (EI/SEC) (SLUGS/FT) (LB-SEC/EI2) (FT-1) (R-0.175FI) (R-0.175FI) (R-0.175FI)

94.2 .023 1.004 3780 2.022E-05 7.581E-08 1.00PE 04 2.466E-02 0.040E-02  
 CAMERA ROLL MU PAINT IFWP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHO/CAK) T8AR(TO) BETA(TO)  
 TOP(T) 7442 300 A0 .0544 2.957E-01 3.4553E-01  
 SIOF(S) 7434  
 MOIC(M) 8568

PIC NO	TIME DELTIME	M(TO)	M(TO)/MREF	M(970)	M(970)/MREF	M(912TO)	M(912TO)/MREF	ST(TO)
T 9874(100)	19.42	18.14	4.413E-03	.1797	5.732E-03	5.530E-03	.2251	7.143E-03
M 5792(100)	19.42	18.14	4.413E-03	.1797	5.732E-03	5.530E-03	.2251	7.143E-03
S 3550(100)	19.42	18.14	4.413E-03	.1797	5.732E-03	5.530E-03	.2251	7.143E-03
M 5793(100)	20.50	19.22	4.247E-03	.1745	5.574E-03	5.373E-03	.2187	6.937E-03
M 5793(100)	20.50	19.22	4.247E-03	.1745	5.574E-03	5.373E-03	.2187	6.937E-03
T 9875(100)	20.52	19.24	4.247E-03	.1744	5.574E-03	5.373E-03	.2187	6.937E-03
T 9875(100)	21.57	20.29	4.172E-03	.1699	5.424E-03	5.229E-03	.2128	6.748E-03
S 3552(100)	21.57	20.29	4.172E-03	.1699	5.424E-03	5.229E-03	.2128	6.748E-03
M 5794(100)	21.57	20.29	4.172E-03	.1699	5.424E-03	5.229E-03	.2128	6.748E-03
T 9877(100)	22.65	21.37	4.066E-03	.1655	5.294E-03	5.095E-03	.2074	6.579E-03
S 3553(100)	22.65	21.37	4.066E-03	.1655	5.294E-03	5.095E-03	.2074	6.579E-03
M 5795(100)	22.65	21.37	4.066E-03	.1655	5.294E-03	5.095E-03	.2074	6.579E-03
T 9878(100)	23.78	22.50	3.943E-03	.1612	5.152E-03	4.956E-03	.2020	6.406E-03
S 3554(100)	23.78	22.50	3.943E-03	.1612	5.152E-03	4.956E-03	.2020	6.406E-03
M 5796(100)	23.78	22.50	3.943E-03	.1612	5.152E-03	4.956E-03	.2020	6.406E-03
T 9879(100)	24.80	24.52	3.745E-03	.1544	4.934E-03	4.757E-03	.1935	6.133E-03
M 5797(100)	24.80	24.52	3.745E-03	.1544	4.934E-03	4.757E-03	.1935	6.133E-03
S 3555(100)	24.80	24.52	3.745E-03	.1544	4.934E-03	4.757E-03	.1935	6.133E-03
T 9880(100)	25.83	24.55	3.644E-03	.1493	4.742E-03	4.571E-03	.1858	5.888E-03
S 3556(100)	25.83	24.55	3.644E-03	.1493	4.742E-03	4.571E-03	.1858	5.888E-03
M 5798(100)	25.83	24.55	3.644E-03	.1493	4.742E-03	4.571E-03	.1858	5.888E-03
T 9881(100)	26.88	24.61	3.514E-03	.1429	4.544E-03	4.404E-03	.1791	5.673E-03
M 5799(100)	26.88	24.61	3.514E-03	.1429	4.544E-03	4.404E-03	.1791	5.673E-03
S 3557(100)	26.88	24.61	3.514E-03	.1429	4.544E-03	4.404E-03	.1791	5.673E-03
T 9882(100)	31.94	30.64	3.345E-03	.1389	4.413E-03	4.254E-03	.1730	5.480E-03
S 3558(100)	31.94	30.64	3.345E-03	.1389	4.413E-03	4.254E-03	.1730	5.480E-03
M 5800(100)	31.94	30.64	3.345E-03	.1389	4.413E-03	4.254E-03	.1730	5.480E-03

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WASA-R1 ORBITER PEATING

AEDC(AROT-INC.) ARNOLD AFS, TENNESSEE

VON KARMAN GAS DYNAMICS FACILITY

50 INCH HYPERSONIC TUNNEL R

VA289

GROUP	COMPID	MODEL	MACH NO	WIND (PSIA)	TO (DEG R)	ALPHA-MODEL	ALPHA-SECTOR	ALPHA-PREBEND	ROLL-MODEL	YAW
6A	2	QWETPM R2	7.95	213.0	1285	30.01	-0.01	-30.00	-180.00	-0.00
T-1NF	P-1NF	Q-1NF	V-1NF	RND-1NF	WU-1NF	RF/FT	HREF	STNEF		
(DEG R)	(PSIA)	(FT/SEC)	(SLUGS/FT <sup>3</sup> )	(LB-SEC/FT <sup>2</sup> )	(FT-1)	(R <sup>2</sup> .0175FI)	(R <sup>2</sup> .0175FI)	(M <sup>2</sup> .0175FI)		
94.2	1.007	3780	2.029E-05	7.522E-06	1.011E 06	2.440E-02	4.062E-02			
CAPCHA	ROLL NO	PAINT TEMP (DEG F)	INITIAL TEMP (DEG F)	SQUARE ROOT (RHOXCRK)	TRAN (TO)	BETA (TO)				
TOP (T)	7442									
SLIP (S)	7434	300	90	.0544	2.957E-01	3.4553E-01				
MOTION (M)	8468									

PIC NO	TIME DELTIME	M(TO)	M(TO)/HREF	M(.912TO)	M(.912TO)/HREF	ST(TO)
M 4001(100)	32.66	32.69	.1336	4.274E-03	.1737	5.303E-03
T 9PM3(100)	33.69	32.71	.1336	4.273E-03	.1737	5.303E-03
S 165V(100)	33.69	32.71	.1336	4.273E-03	.1737	5.303E-03
MODEL HAS LEFT CENTERLINE						
T 9PM4(100)	36.02	34.74	.1296	4.166E-03	.1624	5.141E-03
S 166V(100)	36.02	34.74	.1296	4.166E-03	.1624	5.141E-03
M 4002(100)	36.02	34.74	.1296	4.166E-03	.1624	5.141E-03
S 166V(100)	36.02	34.74	.1296	4.166E-03	.1624	5.141E-03
M 4003(100)	36.04	34.77	.1296	4.030E-03	.1578	4.995E-03
T 9PM5(100)	36.04	34.77	.1296	4.030E-03	.1578	4.995E-03
S 166V(100)	36.04	34.77	.1296	4.030E-03	.1578	4.995E-03
M 4004(100)	40.07	34.79	.1225	3.782E-03	.1536	4.886E-03
T 9PM6(100)	40.10	34.82	.1225	3.782E-03	.1535	4.859E-03
S 166V(100)	40.10	34.82	.1225	3.782E-03	.1535	4.859E-03

7442  
6857  
CWC

8595  
 $\alpha = 30^\circ$   
 $\phi = 0^\circ$

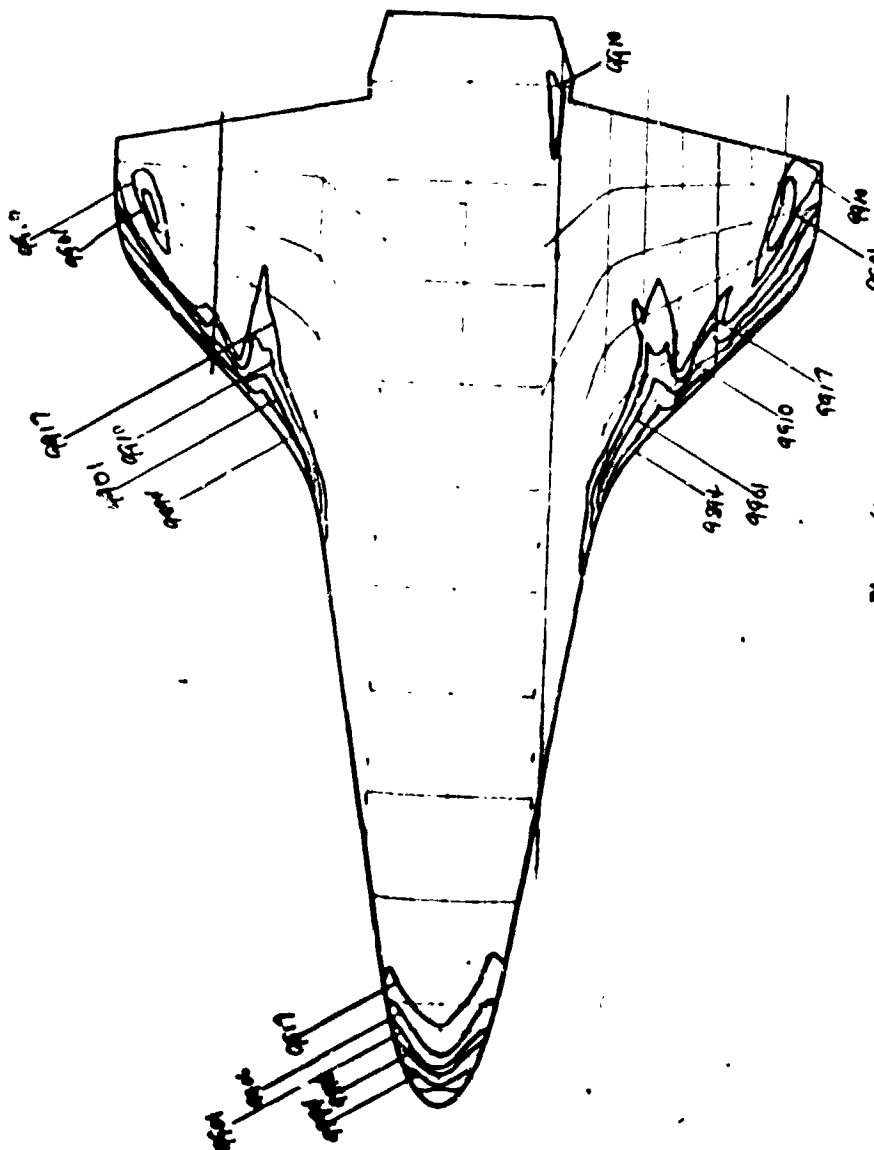


Figure 64

REPRODUCIBILITY OF THE ORIGINAL PAGE IS POOR.

Group 67  
8468

4528  
 $\alpha = 30^\circ$   
 $\phi = 0^\circ$

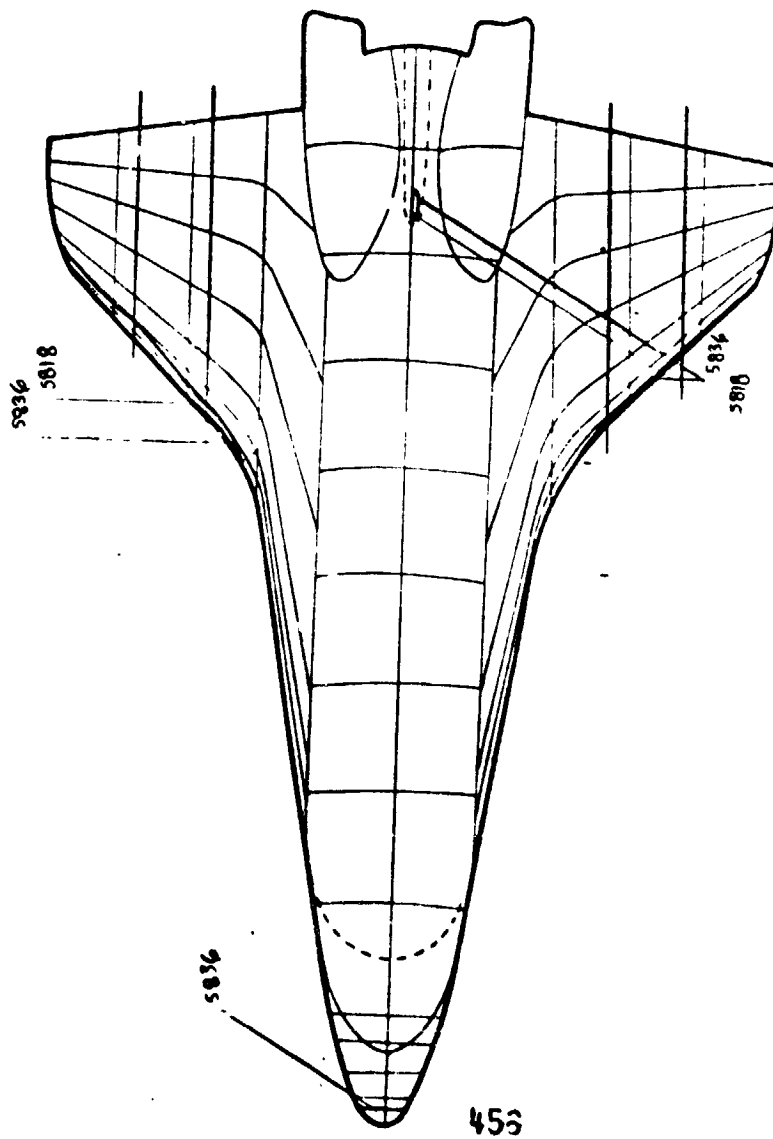


Figure 65

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AFDC(AMO-INC.) ARNOLD AFS, TENNESSEE  
VON KARMAN GAS DYNAMICS FACILITY  
50 INCH HYPERSONIC TUNNEL 9

NASA-RI ORBITER HEATING

VA289

GROUP CNAME MODEL MACH NO PO(PSIA) TO(DEG R) ALPHA-MODEL ALPHA-SECTION ALPHA-PREPEND ROLL-MODEL YAW  
67 2 ORBITER S 7.95 212.4 1285 30.02 -.02 -30.00 -180.00 -.00

T-1AF P-INF Q-INF V-INF RHG-INF MU-INF RE/FT HREF STREF  
(DEG R) (PSIA) (FT/SEC) (SLUGS/FT<sup>3</sup>) (LBS/SEC/FT<sup>2</sup>) (EI-L) (R<sup>2</sup>-.0175EI) (H<sup>2</sup>-.0175EI)  
94.2 .023 1.023 3760 2.019E-05 7.522E-08 1.007E 06 2.444E-02 4.052E-02

CAMERA HOLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHOXAK) TRAR(TO) BETA(TO)  
TOPI(T) 7442  
SIDE(S) 7434  
NOTION(B) 8468

PIC NO TIME DELTIME H(TO) H(TO)/HREF H(.912TO) H(.912TO)/HREF ST(TO)

T 9897(100) 1.15 MODEL HAS NOT REACHED CENTERLINE  
M 9898(100) 1.15 MODEL HAS NOT REACHED CENTERLINE  
S 3553(100) 1.18 MODEL HAS NOT REACHED CENTERLINE  
H 5004(100) 2.23 MODEL HAS NOT REACHED CENTERLINE  
T 9899(100) 2.25 MODEL HAS NOT REACHED CENTERLINE  
S 3564(100) 2.25 MODEL HAS NOT REACHED CENTERLINE  
INJECT TIME = 2.28

T 9894(100) 3.30 DATA NOT YET VALID  
M 5001(100) 3.30 DATA NOT YET VALID  
S 3565(100) 3.33 DATA NOT YET VALID

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T 9890(100) 4.38 1.065E-02 .4344 1.336E-02 .5442 1.728E-02  
M 5000(100) 4.38 1.065E-02 .4344 1.336E-02 .5442 1.728E-02  
S 3566(100) 4.41 1.062E-02 .4327 1.331E-02 .5421 1.722E-02  
T 9891(100) 5.46 4.18 9.189E-03 .3743 1.194E-02 .4665 1.489E-02  
S 3567(100) 5.46 4.18 9.189E-03 .3743 1.194E-02 .4665 1.489E-02  
M 5009(100) 5.46 4.18 9.189E-03 .3743 1.194E-02 .4665 1.489E-02  
T 9892(100) 6.53 5.25 8.144E-03 .3337 1.026E-02 .4180 1.327E-02  
S 3568(100) 6.53 5.25 8.144E-03 .3337 1.026E-02 .4180 1.327E-02  
M 5010(100) 6.53 5.25 8.144E-03 .3337 1.026E-02 .4180 1.327E-02  
T 9893(100) 7.61 6.33 7.465E-03 .3040 9.351E-03 .3809 1.209E-02  
S 3569(100) 7.61 6.33 7.465E-03 .3040 9.351E-03 .3809 1.209E-02  
M 5011(100) 8.68 7.41 6.901E-03 .2911 8.645E-03 .3521 1.118E-02  
T 9894(100) 8.68 7.41 6.901E-03 .2911 8.645E-03 .3521 1.118E-02  
S 3570(100) 8.68 7.41 6.901E-03 .2911 8.645E-03 .3521 1.118E-02  
M 5012(100) 9.74 8.46 6.458E-03 .2629 8.090E-03 .3294 1.045E-02

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AEIC (ARO, INC.) ARNOLD AFS, TENNESSEE  
VON KARMAN GAS DYNAMICS FACILITY  
50 INCH HYPERSONIC TUNNEL

50 INCH HYPERSONIC TUNNEL R

GROUP	CONFID	MODEL	MACH NO	PO (PSIA)	TO (DEG R)	ALPHA-MODEL	ALPHA-SECTOR	ALPHA-PREREND	ROLL-MODEL	YAW
67	2	ORBITER S	7.95	213.1	1285	30.02	-0.02	-30.00	-100.00	-0.00

**TRER**

(DF6 R)	(PS1A)	(PS1A)	(F1/SEC)	(SLUGS/FT3)	(LH-SEC/FT2)	(F-1)	(RW-.0175F1)	(R--0175F1)
99.2	.023	1.006	3700	2.026F-05	7.542F-04	1.010E 06	2.458E-02	4.045E-02

CANFGA	ROLL NO	PAINT TEMP (DEG F)	INITIAL TEMP (DEG F)	SQARE ROOT (RHCKCKXK)	TBAR(TO)	BETA(TO)
1	1	1	1	1	1	1

	7442	7434	90	.A544	2.955E-01	3.4524E-01
TOTAL						
INCOME (\$)			300			

SICF(S)	7434
MOIICM(B)	846H

PIC NO	TIME	DELTIME	M(TOI)	M(TOI)/HREF	M.(STO)	M.(9TOI)/HREF	M.(912TOI)	M.(912TOI)/HREF	ST(101)
T 9904(1300)	19.42	19.14	4.409E-03	.1794	5.731E-03	.2332	5.524E-03	.2248	7.130E-03
S 3581(1301)	19.42	19.14	4.409E-03	.1794	5.731E-03	.2332	5.524E-03	.2248	7.130E-03
M 5822(1302)	19.42	19.14	4.409E-03	.1794	5.731E-03	.2332	5.524E-03	.2248	7.130E-03
M 5823(1303)	20.47	19.19	4.247E-03	.1744	5.572E-03	.2267	5.370E-03	.2105	6.929E-03
T 9905(1300)	20.50	19.22	4.244E-03	.1743	5.568E-03	.2265	5.367E-03	.2103	6.925E-03
S 3581(1301)	20.50	19.22	4.244E-03	.1743	5.568E-03	.2265	5.367E-03	.2103	6.925E-03
M 5824(1300)	21.55	20.27	4.171E-03	.1697	5.422E-03	.2205	5.226E-03	.2126	6.740E-03
T 9906(1301)	21.57	20.34	4.169E-03	.1696	5.419E-03	.2205	5.223E-03	.2125	6.741E-03
S 3582(1301)	21.57	20.34	4.169E-03	.1696	5.419E-03	.2205	5.223E-03	.2125	6.741E-03
T 9907(1301)	22.63	21.35	4.065E-03	.1653	5.284E-03	.2149	5.092E-03	.2071	6.564E-03
M 5825(1301)	22.63	21.35	4.065E-03	.1653	5.284E-03	.2149	5.092E-03	.2071	6.564E-03
S 3583(1301)	22.65	21.37	4.042E-03	.1652	5.281E-03	.2147	5.089E-03	.2070	6.561E-03
S 3584(1301)	23.70	22.42	3.966E-03	.1613	5.153E-03	.2097	4.969E-03	.2021	6.408E-03
M 5826(1301)	23.70	22.42	3.966E-03	.1613	5.153E-03	.2097	4.969E-03	.2021	6.408E-03
T 9908(1301)	23.73	22.45	3.944E-03	.1612	5.152E-03	.2096	4.966E-03	.2020	6.404E-03
T 9909(1301)	24.78	23.50	3.874E-03	.1576	5.036E-03	.2048	4.853E-03	.1974	6.260E-03
T 9910(1301)	24.78	23.50	3.874E-03	.1576	5.036E-03	.2048	4.853E-03	.1974	6.260E-03
M 5827(1301)	25.65	24.58	3.744E-03	.1541	4.924E-03	.2003	4.746E-03	.1930	6.121E-03
S 3585(1301)	25.65	24.58	3.744E-03	.1541	4.924E-03	.2003	4.746E-03	.1930	6.121E-03
M 5828(1301)	26.55	25.63	3.710E-03	.1509	4.822E-03	.2003	4.746E-03	.1930	6.121E-03
T 9911(1301)	26.53	25.65	3.708E-03	.1508	4.820E-03	.1960	4.645E-03	.1889	5.988E-03
M 5829(1301)	26.53	25.65	3.708E-03	.1508	4.820E-03	.1960	4.645E-03	.1889	5.988E-03
S 3586(1301)	27.58	26.74	3.644E-03	.1478	4.724E-03	.1921	4.553E-03	.1851	5.867E-03



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NASA-R1 ORBITER PEATING  
 VA200  
 AEDC(AMC-INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL R

GROUP COMFIC MODEL MACH NO PO(PSIA) IO(DEG R) ALPHA-MODEL ALPHA-SECTION ALPHA-PREBEND ROLL-MODEL YAW  
 67 2 ORBITER S 7.95 213.4 1285 30.02 -.02 -30.00 -180.00 --.00  
 T-1NF P-1NF O-1NF V-1NF MU-1NF PF/FT MREF STREF  
 (DEG R) (PSIA) (FT/SEC) (SLUGS/FT<sup>3</sup>) (LB-SEC/FT<sup>2</sup>) (FI-1) (H<sub>2</sub> .0175FI) (H<sub>2</sub> .0175FI)  
 94.2 .023 1.007 3781 7.583E-05 1.011E 04 2.460E-02 4.043E-02  
 CAMERA HULL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHO/CAK) TRARITO BETA(ITO)  
 TOP(IT) 7442  
 SINC(S) 7434  
 MOTION(M) 8468  
 2.955E-01 3.4524E-01

PTC NO TIME DELTIME H(TO) HREF H(-910) H(-910)/HREF H(-91210) H(-91210)/HREF ST(ITO)  
 T 99121(100) 28.01 26.73 3.633E-03 .1478 4.722E-03 .1921 4.551E-03 .1851 5.869E-03  
 S 35881(100) 28.01 26.73 3.633E-03 .1478 4.722E-03 .1921 4.551E-03 .1851 5.869E-03  
 M 54311(100) 29.06 27.78 3.563E-03 .1449 4.632E-03 .1883 4.464E-03 .1815 5.754E-03  
 T 99131(100) 29.08 27.87 3.562E-03 .1448 4.630E-03 .1882 4.462E-03 .1814 5.749E-03  
 S 35894(100) 29.08 27.87 3.562E-03 .1448 4.630E-03 .1882 4.462E-03 .1814 5.749E-03  
 T 99141(100) 30.13 28.84 3.446E-03 .1421 4.545E-03 .1848 4.380E-03 .1781 5.644E-03  
 S 35321(100) 30.13 28.84 3.446E-03 .1421 4.545E-03 .1848 4.380E-03 .1781 5.644E-03  
 M 54321(100) 30.16 28.88 3.445E-03 .1421 4.543E-03 .1847 4.374E-03 .1780 5.643E-03  
 T 99151(100) 31.21 29.92 3.433E-03 .1396 4.462E-03 .1815 4.300E-03 .1749 5.543E-03  
 S 35331(100) 31.21 29.92 3.433E-03 .1396 4.462E-03 .1815 4.300E-03 .1749 5.543E-03  
 M 54331(100) 31.24 29.94 3.431E-03 .1395 4.460E-03 .1813 4.294E-03 .1748 5.539E-03  
 T 99161(100) 32.29 31.01 3.337E-03 .1371 4.344E-03 .1782 4.225E-03 .1718 5.444E-03  
 S 35921(100) 32.29 31.01 3.337E-03 .1371 4.344E-03 .1782 4.225E-03 .1718 5.444E-03  
 M 54341(100) 32.29 31.01 3.337E-03 .1371 4.344E-03 .1782 4.225E-03 .1718 5.444E-03  
 T 99171(100) 33.26 32.08 3.316E-03 .1349 4.310E-03 .1753 4.154E-03 .1690 5.357E-03  
 S 35931(100) 33.26 32.08 3.316E-03 .1349 4.310E-03 .1753 4.154E-03 .1690 5.357E-03  
 M 54351(100) 33.26 32.08 3.316E-03 .1349 4.310E-03 .1753 4.154E-03 .1690 5.357E-03  
 MODEL HAS LEFT CENTRAL LINE  
 T 99181(100) 34.24 33.14 3.201E-03 .1326 4.239E-03 .1724 4.086E-03 .1662 5.266E-03  
 S 35941(100) 34.24 33.14 3.201E-03 .1326 4.239E-03 .1724 4.086E-03 .1662 5.266E-03  
 M 54361(100) 34.24 33.14 3.201E-03 .1326 4.239E-03 .1724 4.086E-03 .1662 5.266E-03

REPRODUCIBILITY OF THE ORIGINAL PAGE IS POOR.

Group 68  
7437  
NO

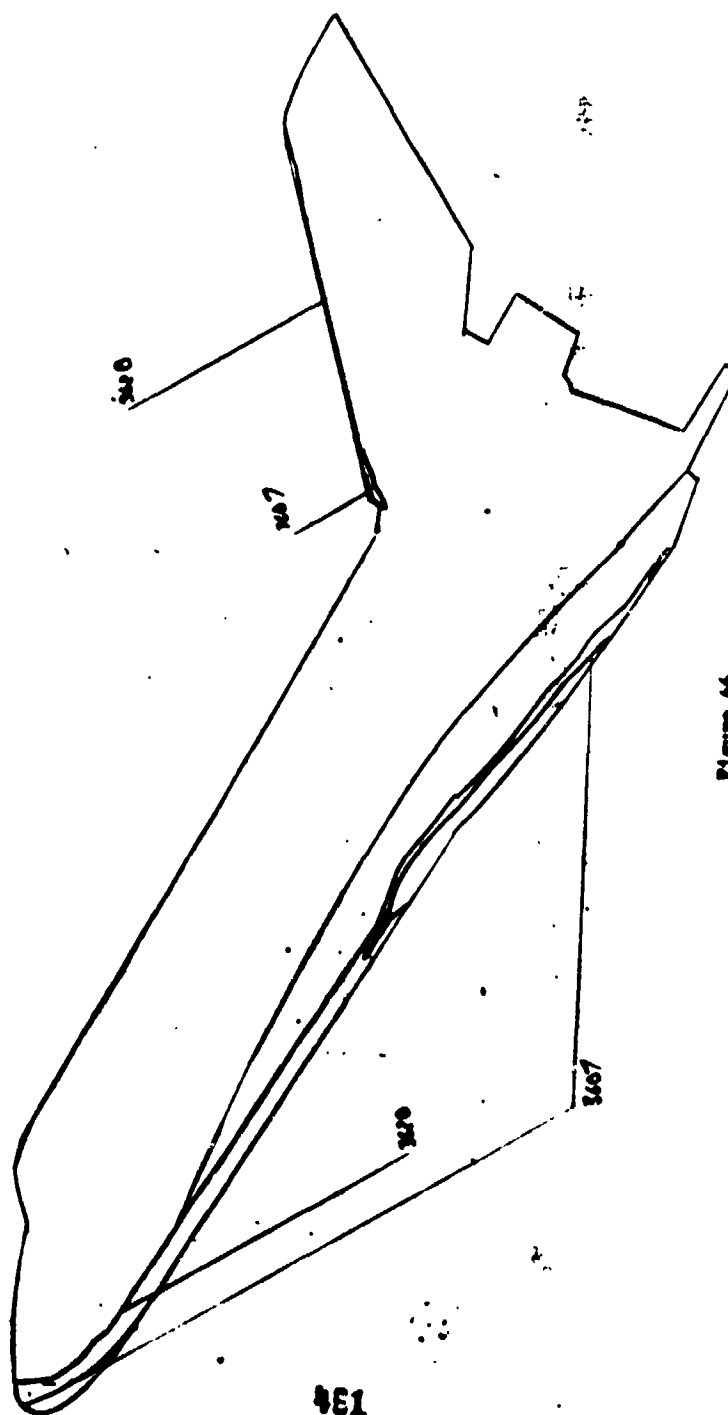


Figure 66

134

7442  
69 88  
69 88

8585  
 $\alpha = 30^\circ$   
 $\phi = 0^\circ$

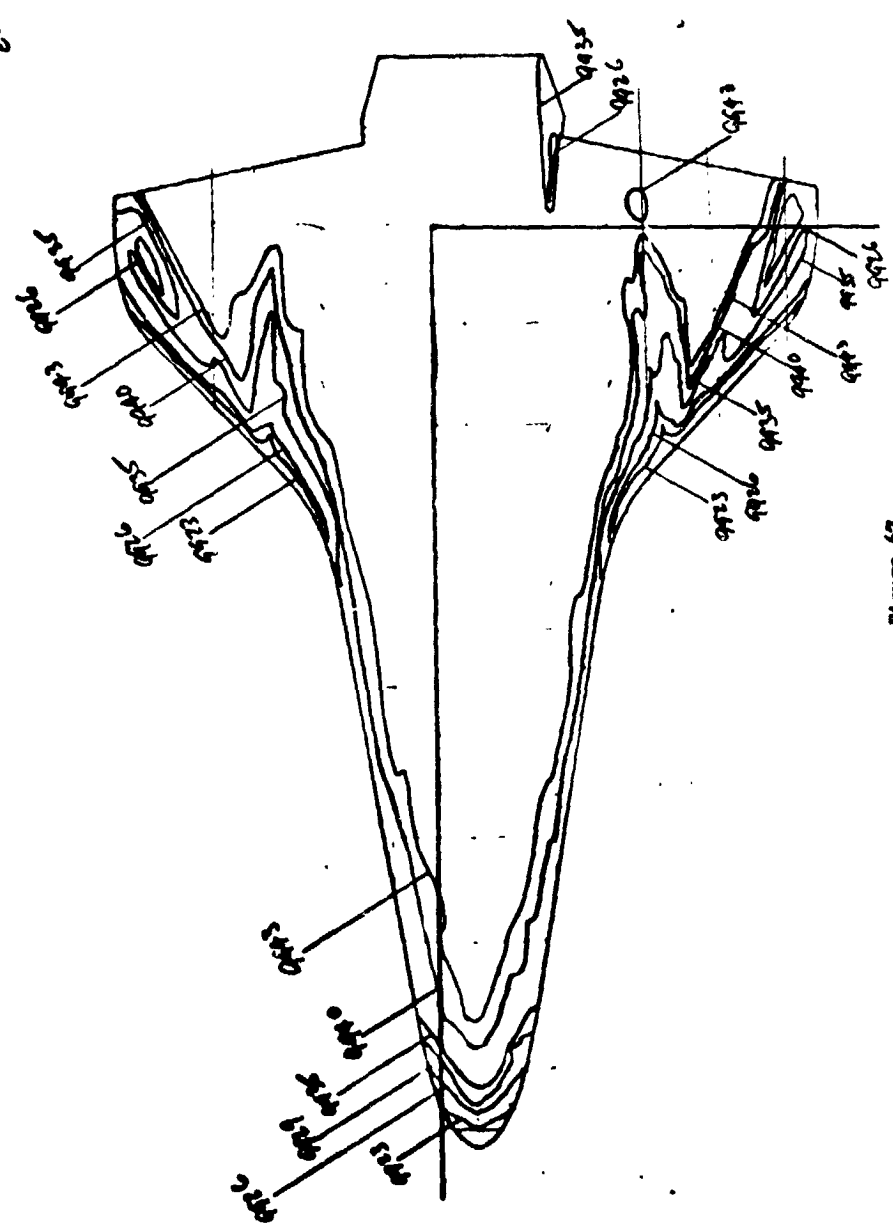


Figure 67

452

Group 68  
8/68  
pds

4528  
 $\alpha = 30^\circ$   
 $\phi = 0^\circ$

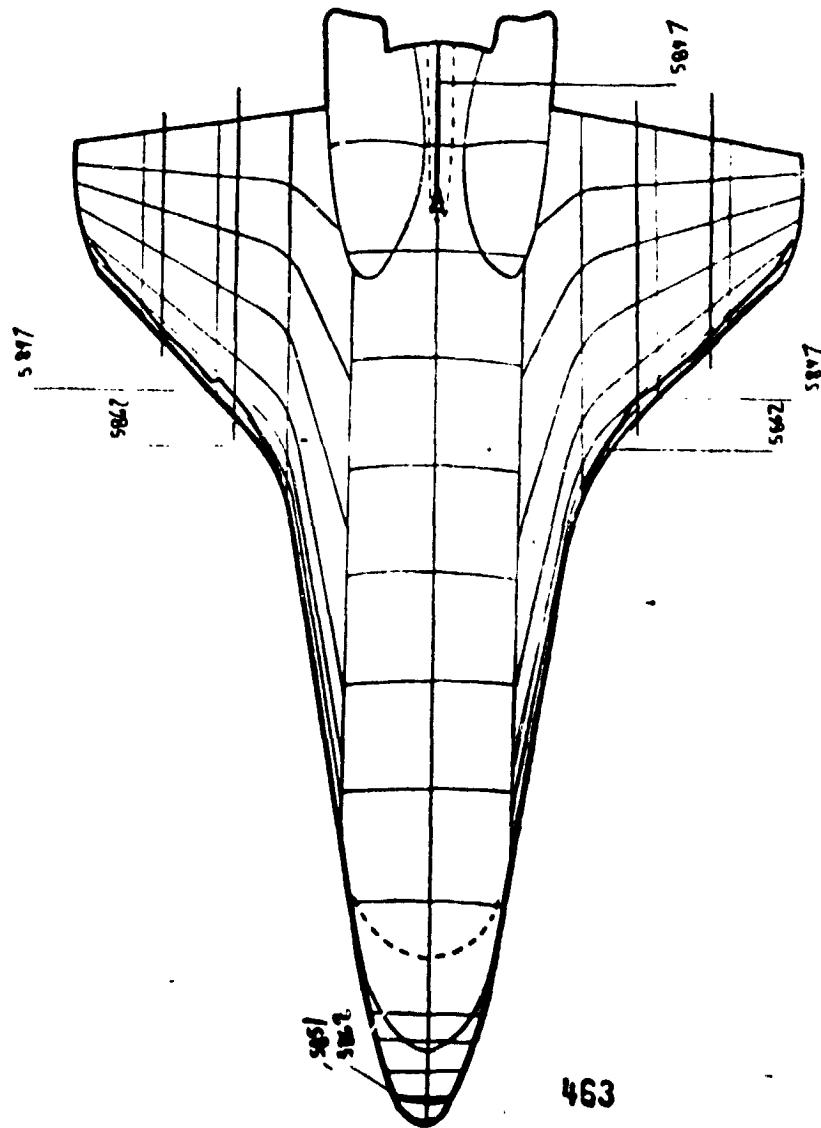


Figure 68

REDCIARG, INC.) ARNOLD AFS, TENNESSEE  
VON KARMAN GAS DYNAMICS FACILITY  
50 INCH HYPERSONIC TUNNEL A

CAMERA	ROLL NO	PAINT FWP (DGF F)	INITIAL TEMP (DEG F)	SQUARE ROOT (RMOJACK)	TRARI(TO)	BETA(TO)
TOP(T)	7442					
SIDE(S)	7434	250	80	.0535		0

10-10-68

DATA	NOT	YES	VALID
DATA	NOT	YES	VALID
DATA	NOT	YES	VALID

[illegible]

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WA209

MEDECIANO, INC.) AMNOLU AFS, TENNESSEE  
VON KARMAN GAS DYNAMICS FACILITY  
50 INCH HYPERSONIC TUNNEL

71 9173

WARRNIP	CNMF1G	MODEL	MACH NO	PH(P(S1A)	Y0(DEG R)	ALPHA-4-MODEL	ALPHA-SECTION	ALPHA-PREBEND	ROLL-MODEL	YAW
68	4	04E11FM 41	7.95	211.3	1277	3A.02	-.02	-30.00	-180.00	-0.00

T-1AF	P-1NF	O-1NF	V-1NF	R(M)-1NF	MU-1NF	RF/FT	MREF	S1REF
(SEC)	(SEC)	(SEC)	(F1/SEC)	(LM-SEC/F12)	(F1-1)	(R <sub>s</sub> -0.175F)	(M <sub>r</sub> -0.175F)	
93.6	92.1	.997	7770	2.5028F-05	7.534F-04	1.010E 04	2.445E-02	0.4049E-02

WELL NO	PAINT TEMP (DEG F)	INITIAL TEMP (DEG F)	SOURF RONT (RHOXCCK)	TRAR(ITO)	BETA(TO)
7442					
7434	254	40	.0535	2.305E-01	2.5117E-01
846R					

PIC NO	TIME RELTIME	M(TO)	M(TO)/MREF	M(.9TO)	M(.9TO)/MREF	M(.912TO)	M(.912TO)/MREF	ST(10)
5	963(250)	9.79	8.51	4.607E-03	1.184	5.866E-03	.2320	7.508E-03
5	9624(250)	10.84	9.54	4.346E-03	1.177	5.336E-03	.2188	7.083E-03
5	9666(250)	10.84	9.54	4.346E-03	1.177	5.336E-03	.2188	7.083E-03
5	9606(250)	10.86	9.58	4.341E-03	1.175	5.327E-03	.2166	7.078E-03
5	9629(250)	11.51	10.64	4.121E-03	1.165	5.247E-03	.2075	6.719E-03
5	3605(250)	11.51	10.64	4.121E-03	1.165	5.247E-03	.2075	6.719E-03
5	9687(250)	11.51	10.64	4.121E-03	1.165	5.247E-03	.2075	6.719E-03
5	9630(250)	12.59	11.71	3.927E-03	1.167	5.008E-03	.1979	6.408E-03
5	9644(250)	12.59	11.71	3.927E-03	1.167	5.008E-03	.1979	6.408E-03
5	3606(250)	13.01	11.74	3.922E-03	1.166	4.995E-03	.1975	6.396E-03
5	9631(250)	16.07	12.79	3.758E-03	1.137	4.785E-03	.1892	6.127E-03
5	5654(250)	16.07	12.79	3.758E-03	1.137	4.785E-03	.1892	6.127E-03
5	9687(250)	16.09	12.81	3.756E-03	1.136	4.780E-03	.1892	6.127E-03
5	9632(250)	15.14	12.86	3.650E-03	1.177	4.596E-03	.1818	5.890E-03
5	3604(250)	15.14	12.86	3.650E-03	1.177	4.596E-03	.1818	5.890E-03
5	9650(250)	15.17	13.84	3.616E-03	1.175	4.591E-03	.1816	5.879E-03
5	3605(250)	16.22	14.94	3.477E-03	1.122	4.472E-03	.1751	5.669E-03
5	9651(250)	16.22	14.94	3.477E-03	1.122	4.472E-03	.1751	5.669E-03
5	9633(250)	16.24	14.97	3.474E-03	1.121	4.470E-03	.1750	5.669E-03
5	9634(250)	17.29	16.02	3.348E-03	1.174	4.276E-03	.1691	5.477E-03
5	9625(250)	17.29	16.02	3.348E-03	1.174	4.276E-03	.1691	5.477E-03
5	3611(250)	17.32	16.04	3.355E-03	1.172	4.276E-03	.1690	5.477E-03
5	9635(250)	18.37	17.09	3.250E-03	1.129	4.134E-03	.1637	5.300E-03
5	5651(250)	18.37	17.09	3.250E-03	1.129	4.134E-03	.1637	5.300E-03
5	9635(250)	18.37	17.09	3.250E-03	1.129	4.134E-03	.1637	5.300E-03

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77 9173

AEDC (AWO, INC.) AMMOLU AFS, TENNESSEE  
VON KARMAN GAS DYNAMICS FACILITY  
50 INCH HYPERSONIC TUNNEL

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6527A

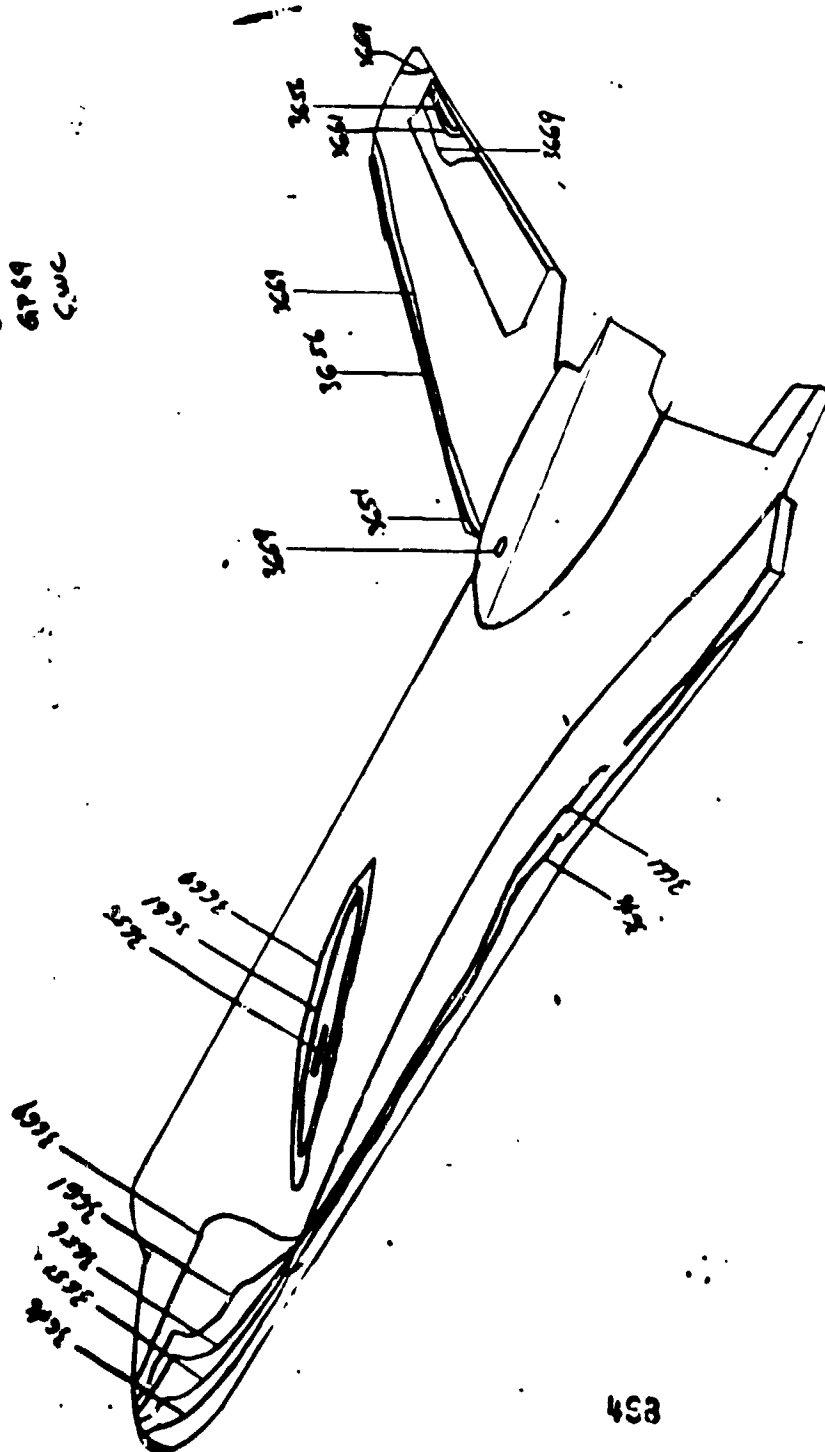
GROUP	COMP16	MODEL	MACH NO	PD(PSTA)	TO(EG B)	LPTA-MODEL	ALPHA-SECTION	ALPHA-PREEND	ROLL-MODEL	YAW
40	4	ORBITRM B1	7.95	211.0	1277	30.02	-.02	-30.00	-180.00	-.00

T-14F	P-14F	Q-14F	V-14F	RMQ-14F	MU-14F	RF/FT	MREF	SINEF
(05G M)	(05IA)	(F12)EC1	(L8-SEC/F12)	(5L8G/F13)	(L8-SEC/F12)	(F1-1)	(M-0175F1)	(M-0175F1)
02	02	004	1770	2-017F-05	7-539F-08	1-005F	2-443E-02	4-051E-02

CAMERA	ROLL NO	PAINT TEMP (DEG F)	INITIAL TEMP (DEG F)	SQUARE ROOT (RMS/CAK)	YEAR(10)	RETA(10)
TOP(1)	7442					
TOP(2)	7443	250	80	.0315	2.305E-01	2.5117E-01

PIC NO	TIME	MELTIME	M(TOI)	M(TOI)/MREF	M(9TO)	M(9TO)/MREF	M(9TO)	M(9TO)/MREF	ST(10)
1	000517501	32.01	2.008E-01	.0086	3.067E-03	2.966E-03	.1216	3.930E-03	
5	000517501	31.13	2.008E-01	.0086	3.067E-03	2.966E-03	.1214	3.930E-03	
		30.24							
			MODEL WAS LEFT CENTERLINE						
T	000517501	30.64	2.333E-03	.0095	2.971E-03	2.874E-03	.1176	3.012E-03	
S	000517501	30.64	2.333E-03	.0095	2.971E-03	2.874E-03	.1176	3.012E-03	
S	000517501	30.64	2.333E-03	.0095	2.971E-03	2.874E-03	.1176	3.012E-03	
T	000517501	30.60	2.264E-03	.0092	2.804E-03	2.709E-03	.1142	3.701E-03	
S	000517501	30.60	2.264E-03	.0092	2.804E-03	2.709E-03	.1142	3.701E-03	
S	000517501	30.60	2.264E-03	.0092	2.804E-03	2.709E-03	.1142	3.701E-03	
M	000517501	30.60	2.264E-03	.0092	2.804E-03	2.709E-03	.1142	3.701E-03	





**69** **உணர்வு**



**Figure 70**

Comp 69  
8471  
10

4528  
 $\alpha = 30^\circ$   
 $\phi = 0^\circ$

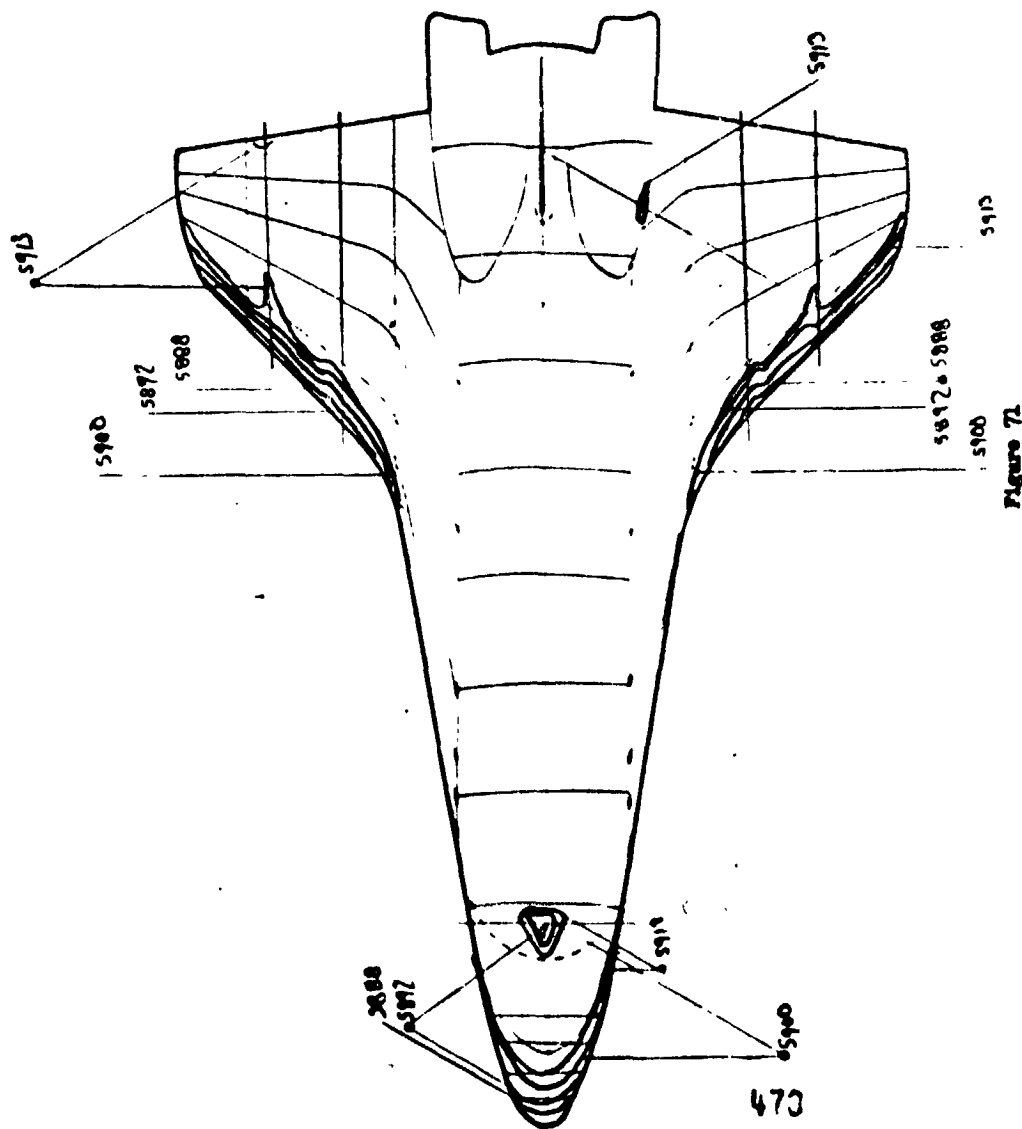


Figure 71

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7/ 9/73

AEDC(ARO,INC.) ARNOLD AFS, TENNESSEE  
VON KARMAN GAS DYNAMICS FACILITY  
50 INCH HYPERSONIC TUNNEL R

NASA-RI ORBITER HEATING  
VA289

GROUP CONFIG MODEL MACH NO P(PSIA) T(DEG R) ALPHA-A-MODEL ALPHA-SECTION ALPHA-PREBEND ROLL-MODEL YAW  
69 2 ORBITER S 7.95 212.1 1274 30.02 -.02 -30.00 -180.00 -.00

T-INF P-INF U-INF V-INF MU-INF MU-INF RE/FT HREF STREF  
(DEG R) (PSIA) (PSIA) (FT/SEC) (SLUGS/FT<sup>3</sup>) (LH-SEC/FT<sup>2</sup>) (F<sup>2</sup>-1) (R=.0175F1) (R=.0175F1)  
93.4 -.023 1.001 3764 2.033E-05 7.519E-08 1.018E 06 2.449E-02 4.034E-02

CAMERA ROLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHQACK) TRAR(TO) BETA(TO)  
TOP(T) 7950  
SIDE(S) 0070  
BOTTOM(B) 0471

PTC NO TIME DELTIME H(TO) H(TO)/HREF H(.912TO) H(.912TO)/HREF ST(TO)

M 5485(131) 1.15 MODEL HAS NOT REACHED CENTERLINE  
T 9964(131) 1.18 MODEL HAS NOT REACHED CENTERLINE  
S 3443(131) 1.18 MODEL HAS NOT REACHED CENTERLINE  
T 9965(131) 2.23 MODEL HAS NOT REACHED CENTERLINE  
S 3444(131) 2.23 MODEL HAS NOT REACHED CENTERLINE  
M 5486(131) 2.23 MODEL HAS NOT REACHED CENTERLINE

INJECT TIME = 2.28  
T 9966(131) 3.20 DATA NOT YET VALID  
S 3445(131) 3.20 DATA NOT YET VALID

M 5487(131) 3.23 1.807E-03 .0734 2.214E-03 .0904 2.154E-03 .0880 2.950E-03  
T 9967(131) 4.16 1.807E-03 .0734 2.214E-03 .0904 2.154E-03 .0880 2.950E-03  
M 5488(131) 4.16 1.807E-03 .0734 2.214E-03 .0904 2.154E-03 .0880 2.950E-03  
S 3446(131) 4.28 1.799E-03 .0735 2.205E-03 .0901 2.145E-03 .0877 2.941E-03  
T 9968(131) 5.43 4.15 1.555E-03 .0635 1.906E-03 .0778 1.854E-03 .0757 2.540E-03  
S 3447(131) 5.43 4.15 1.555E-03 .0635 1.906E-03 .0778 1.854E-03 .0757 2.540E-03  
M 5489(131) 5.43 4.15 1.555E-03 .0635 1.906E-03 .0778 1.854E-03 .0757 2.540E-03  
T 9969(131) 6.48 5.20 1.349E-03 .0567 1.702E-03 .0695 1.656E-03 .0676 2.269E-03  
S 3448(131) 6.48 5.20 1.349E-03 .0567 1.702E-03 .0695 1.656E-03 .0676 2.269E-03  
M 5490(131) 6.51 5.23 1.346E-03 .0566 1.694E-03 .0694 1.652E-03 .0675 2.264E-03  
T 9970(131) 7.56 6.28 1.265E-03 .0517 1.550E-03 .0633 1.508E-03 .0616 2.066E-03  
S 3449(131) 7.56 6.28 1.265E-03 .0517 1.550E-03 .0633 1.508E-03 .0616 2.066E-03  
M 5491(131) 7.56 6.28 1.265E-03 .0517 1.550E-03 .0633 1.508E-03 .0616 2.066E-03  
T 9971(131) 8.61 7.33 1.170E-03 .0474 1.434E-03 .0586 1.395E-03 .0570 1.913E-03  
S 3450(131) 8.61 7.33 1.170E-03 .0474 1.434E-03 .0586 1.395E-03 .0570 1.913E-03  
M 5492(131) 8.63 7.34 1.166E-03 .0477 1.432E-03 .0585 1.393E-03 .0569 1.908E-03  
T 9972(131) 9.69 8.41 1.043E-03 .0446 1.339E-03 .0547 1.303E-03 .0532 1.785E-03  
S 3451(131) 9.69 8.41 1.043E-03 .0446 1.339E-03 .0547 1.303E-03 .0532 1.785E-03  
M 5493(131) 9.69 8.41 1.043E-03 .0446 1.339E-03 .0547 1.303E-03 .0532 1.785E-03

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7/ 9/73

NASA-RI ORBITER HEATING

AEDCI(ARO-INC.) ARNOLD AFS, TENNESSEE  
VON KARMAN GAS DYNAMICS FACILITY  
50 INCH HYPERSONIC TUNNEL R

VA289

GROUP CONFID MODEL MACH NO POI(PSTA) TO(DEG R) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREBEND ROLL-MODEL YAW  
69 2 ORBITER S 7.95 212.1 1274 30.02 -.02 -30.00 -180.00 -.00

T-INF P-INF Q-INF V-INF MU-INF RMU-INF MU-INF RE/FT HREF STREF  
(DEG R) (PSTA) (PSIA) (FI/SEC) (SLUGS/FI3) (LB-SEC/FI2) (FT-1) (R=.0175FI) (R=.0175FI)  
93.4 .023 1.001 3764 2.033E-05 7.518E-08 1.018E 04 2.449E-02 4.034E-02

CAMERA HOLL NO PAINT TFWP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHOCACK) TRAR(ITO) BETA(ITO)

TOP(IT) 7950  
SIDF(S) 8070  
MOTICM(B) 8471

.04P6 6.952E-02 6.5203E-02

PIC NO	TIME DELTITE	H(ITO)	H(ITO)/HREF	H(.91TO)	H(.91TO)/HREF	H(.912TO)	H(.912TO)/HREF	ST(ITO)
T 9973(131)	10.74	9.44	1.030E-03	.0421	1.263E-03	1.228E-03	.0502	1.683E-03
M 5894(131)	10.74	9.45	1.030E-03	.0421	1.263E-03	1.228E-03	.0502	1.683E-03
S 3652(131)	10.76	9.48	1.029E-03	.0420	1.261E-03	1.227E-03	.0501	1.680E-03
T 9974(131)	11.59	10.51	9.775E-04	.0399	1.194E-03	1.165E-03	.0476	1.595E-03
S 3653(131)	11.59	10.51	9.775E-04	.0399	1.194E-03	1.165E-03	.0476	1.595E-03
M 5495(131)	11.51	10.53	9.743E-04	.0399	1.192E-03	1.164E-03	.0475	1.595E-03
T 9975(131)	12.86	11.59	9.310E-04	.0380	1.141E-03	1.110E-03	.0453	1.521E-03
S 3654(131)	12.86	11.59	9.310E-04	.0380	1.141E-03	1.110E-03	.0453	1.521E-03
M 5496(131)	12.86	11.59	9.310E-04	.0380	1.141E-03	1.110E-03	.0453	1.521E-03
T 9976(131)	13.52	12.64	8.914E-04	.0364	1.092E-03	1.062E-03	.0434	1.456E-03
S 3655(131)	13.54	12.64	8.905E-04	.0364	1.091E-03	1.062E-03	.0434	1.454E-03
T 9977(131)	14.59	13.71	8.557E-04	.0349	1.049E-03	1.020E-03	.0417	1.397E-03
S 3656(131)	14.59	13.71	8.557E-04	.0349	1.049E-03	1.020E-03	.0417	1.397E-03
M 5497(131)	14.59	13.71	8.557E-04	.0349	1.049E-03	1.020E-03	.0417	1.397E-03
T 9978(131)	16.04	14.74	8.247E-04	.0337	1.011E-03	9.832E-04	.0402	1.347E-03
S 3657(131)	16.07	14.79	8.240E-04	.0337	1.010E-03	9.823E-04	.0401	1.346E-03
T 9979(131)	17.12	15.84	7.962E-04	.0325	9.757E-04	9.492E-04	.0388	1.301E-03
S 3658(131)	17.12	15.84	7.962E-04	.0325	9.757E-04	9.492E-04	.0388	1.301E-03
M 5498(131)	17.12	15.84	7.962E-04	.0325	9.757E-04	9.492E-04	.0388	1.301E-03
T 9980(131)	18.17	16.89	7.710E-04	.0315	9.449E-04	9.192E-04	.0375	1.259E-03
S 3659(131)	18.17	16.89	7.710E-04	.0315	9.449E-04	9.192E-04	.0375	1.259E-03
M 5499(131)	18.20	16.92	7.704E-04	.0315	9.442E-04	9.185E-04	.0375	1.259E-03
T 9981(131)	19.22	17.94	7.481E-04	.0304	9.169E-04	8.919E-04	.0364	1.222E-03

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7/ 9/73

AEDC(ARO,INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL A

NASA-RI ORBITER HEATING

VA209

GROUP	CNFG	MODEL	MACH NO	POISIA	TOIDEG R	ALPHA-MODEL	ALPHA-SECTION	ALPHA-PREBEND	ROLL-MODEL	YAW
69	2	ORBITER S	7.95	212.1	1274	30.02	-0.02	-30.00	-180.00	-0.00
T-1AF	P-1MF	Q-1MF	V-1MF	RHO-1MF	MU-1MF	HF/FT	MREF	S1REF		
(DEG R)	(PSIA)	(PSIA)	(FI/SEC)	(SLUGS/FT3)	(LB-SEC/FT2)	(FT-1)	(R=.0175FI)	(R=.0175FI)		
93.4	.023	1.001	3704	2.033E-05	7.510E-08	1.010E 05	2.449E-02	4.034E-02		
CAMERA	ROLL NO	PAINT TEMP (DEG F)	INITIAL TEMP (DEG F)	SQUARE ROOT (RHO/CX)	TRAR(TO)	BETA(TO)				
TOP(T)	7550									
SIDE(S)	8070	131	80	.0486	6.952E-02	6.5203E-02				
MOTIM(B)	8371									

PIC NO	TIME DELTIME	M(TO)	M(TO)/MREF	M(-910)	M(-910)/MREF	M(-912IO)	M(-912IO)/MREF	ST(TO)
T 9981(131)	19.25	7.476E-04	.0305	9.162E-04	.0374	8.912E-04	.0364	1.222E-03
S 1660(131)	19.25	7.476E-04	.0305	9.162E-04	.0374	8.912E-04	.0364	1.222E-03
T 9982(131)	20.30	7.266E-04	.0297	8.905E-04	.0364	8.663E-04	.0354	1.187E-03
S 1661(131)	20.30	7.266E-04	.0297	8.905E-04	.0364	8.663E-04	.0354	1.187E-03
T 9983(131)	20.30	7.266E-04	.0297	8.905E-04	.0364	8.663E-04	.0354	1.187E-03
S 1662(131)	21.35	7.073E-04	.0289	8.692E-04	.0354	8.433E-04	.0345	1.156E-03
T 9984(131)	21.37	7.073E-04	.0289	8.692E-04	.0354	8.433E-04	.0345	1.156E-03
S 1663(131)	22.43	6.841E-04	.0281	8.445E-04	.0345	8.215E-04	.0336	1.126E-03
T 9985(131)	22.43	6.841E-04	.0281	8.445E-04	.0345	8.215E-04	.0336	1.126E-03
S 1664(131)	23.48	6.726E-04	.0275	8.243E-04	.0337	8.018E-04	.0328	1.099E-03
T 9986(131)	23.48	6.726E-04	.0275	8.243E-04	.0337	8.018E-04	.0328	1.099E-03
S 1665(131)	24.75	6.540E-04	.0267	8.015E-04	.0328	7.797E-04	.0319	1.069E-03
T 9987(131)	24.75	6.540E-04	.0267	8.015E-04	.0328	7.797E-04	.0319	1.069E-03
S 1666(131)	25.50	6.275E-04	.0256	7.690E-04	.0314	7.481E-04	.0306	1.026E-03
T 9988(131)	25.50	6.275E-04	.0256	7.690E-04	.0314	7.481E-04	.0306	1.026E-03
S 1667(131)	26.81	6.040E-04	.0247	7.402E-04	.0302	7.200E-04	.0294	9.871E-04
T 9989(131)	26.81	6.040E-04	.0247	7.402E-04	.0302	7.200E-04	.0294	9.871E-04
S 1668(131)	27.55	6.037E-04	.0247	7.398E-04	.0302	7.197E-04	.0294	9.871E-04
T 9990(131)	27.55	6.037E-04	.0247	7.398E-04	.0302	7.197E-04	.0294	9.871E-04
S 1669(131)	30.26	5.826E-04	.0238	7.140E-04	.0292	6.946E-04	.0284	9.523E-04
T 9991(131)	30.26	5.826E-04	.0238	7.140E-04	.0292	6.946E-04	.0284	9.523E-04
S 1670(131)	30.26	5.826E-04	.0238	7.140E-04	.0292	6.946E-04	.0284	9.523E-04

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7/ 9/73

AEDC(ARND INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL #

NASA-R1 ORBITER HEATING

VA209

ARND 7 CMF16 MODEL MACH NO PN(PSIA) TO(IDEG R) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREBEND ROLL-MODEL YAW  
 69 9 08178 S 7.95 211.9 1274 30.02 -.02 -30.00 -180.00 -.00  
 T-1AF P-INF Q-INF V-INF RHO-INF MU-INF RE/FT HREF STREF  
 (DEG R) (PSIA) (PSIA) (FT/SEC) (SLUGS/FT<sup>3</sup>) (LB-SEC/FT<sup>2</sup>) (FT-1) (R= .0175FT) (R= .0175FT)  
 93.4 .023 1.000 3764 2.032E-05 7.517E-08 1.017E 06 2.447E-02 4.036E-02

CAMERA ROLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHOXCHK) TRAR(10) BETA(10)  
 TOP(T) 7950  
 SINE(S) 8070 131 80 .0494 6.952E-02 6.5203E-02  
 MOTION(R) 8471

PIC NO	TIME DELTIVE	M(10)	M(10)/HREF	M(.910)	M(.910)/HREF	M(.91210)	M(.91210)/HREF	ST(10)
T 9990(131)	32.89 31.61	5.636E-04	.0230	6.908E-04	.0242	6.720E-04	.0275	9.220E-04
S 3659(131)	32.89 31.61	5.636E-04	.0230	6.908E-04	.0242	6.720E-04	.0275	9.220E-04
M 5911(131)	32.89 31.61	5.636E-04	.0230	6.908E-04	.0242	6.720E-04	.0275	9.220E-04
T 9991(131)	34.62 31.64	5.444E-04	.0223	6.698E-04	.0274	6.514E-04	.0266	8.934E-04
M 5912(131)	34.62 31.64	5.444E-04	.0223	6.698E-04	.0274	6.514E-04	.0266	8.934E-04
S 3670(131)	34.94 33.64	5.302E-04	.0223	6.694E-04	.0277	6.511E-04	.0266	8.939E-04
T 9992(131)	36.57 35.69	5.304E-04	.0217	6.501E-04	.0246	6.324E-04	.0259	8.677E-04
S 3671(131)	36.57 35.69	5.304E-04	.0217	6.501E-04	.0246	6.324E-04	.0259	8.677E-04
M 5913(131)	36.57 35.69	5.304E-04	.0217	6.501E-04	.0246	6.324E-04	.0259	8.677E-04
T 9993(131)	38.59 37.72	5.160E-04	.0211	6.324E-04	.0258	6.152E-04	.0251	8.441E-04
S 3672(131)	38.59 37.72	5.160E-04	.0211	6.324E-04	.0258	6.152E-04	.0251	8.441E-04
M 5914(131)	38.59 37.72	5.160E-04	.0211	6.324E-04	.0258	6.152E-04	.0251	8.441E-04

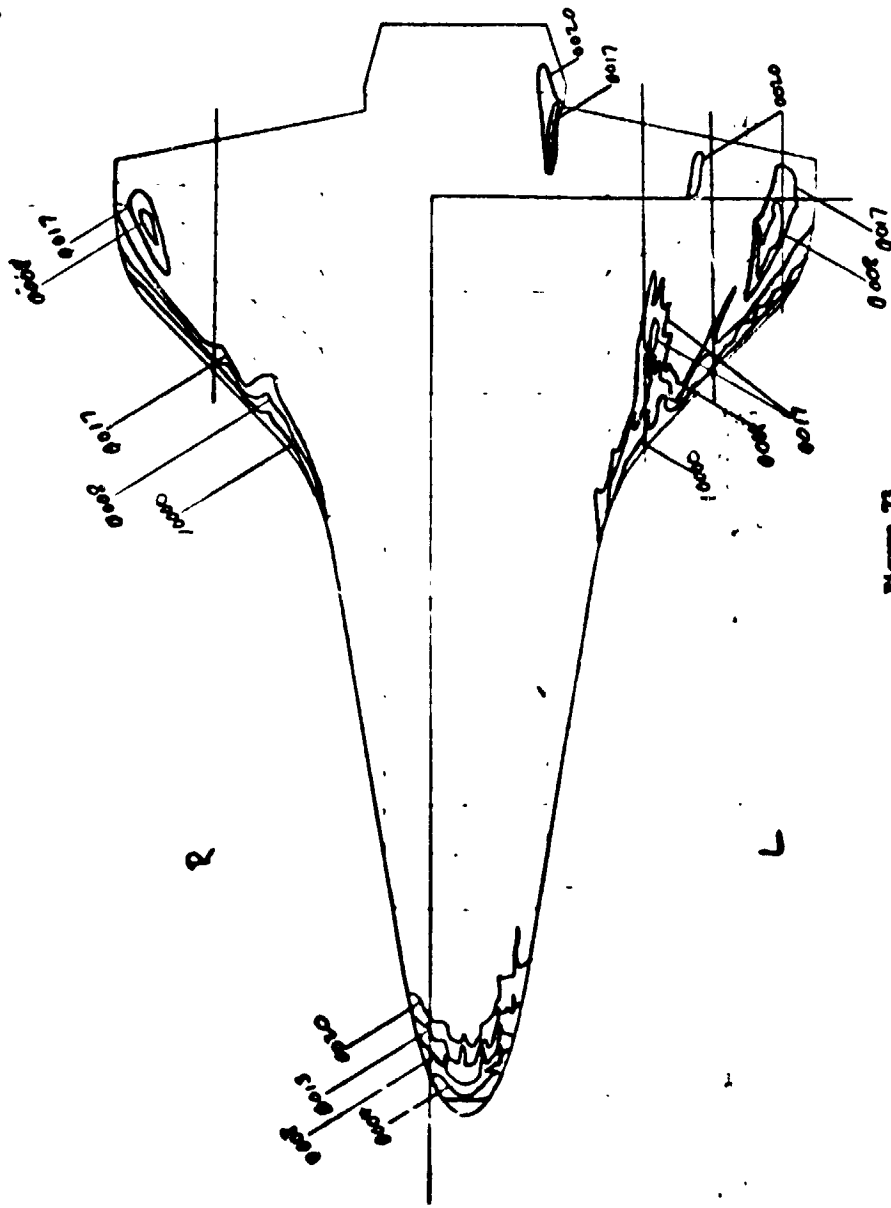
MODEL HAS LEFT CENTRAL LINE





7950  
GP 70  
C 24

8595  
 $\alpha = 30^\circ$   
 $\phi = 0^\circ$



6.000 70  
8 471

4528  
 $\alpha = 30^\circ$   
 $\phi = 0^\circ$

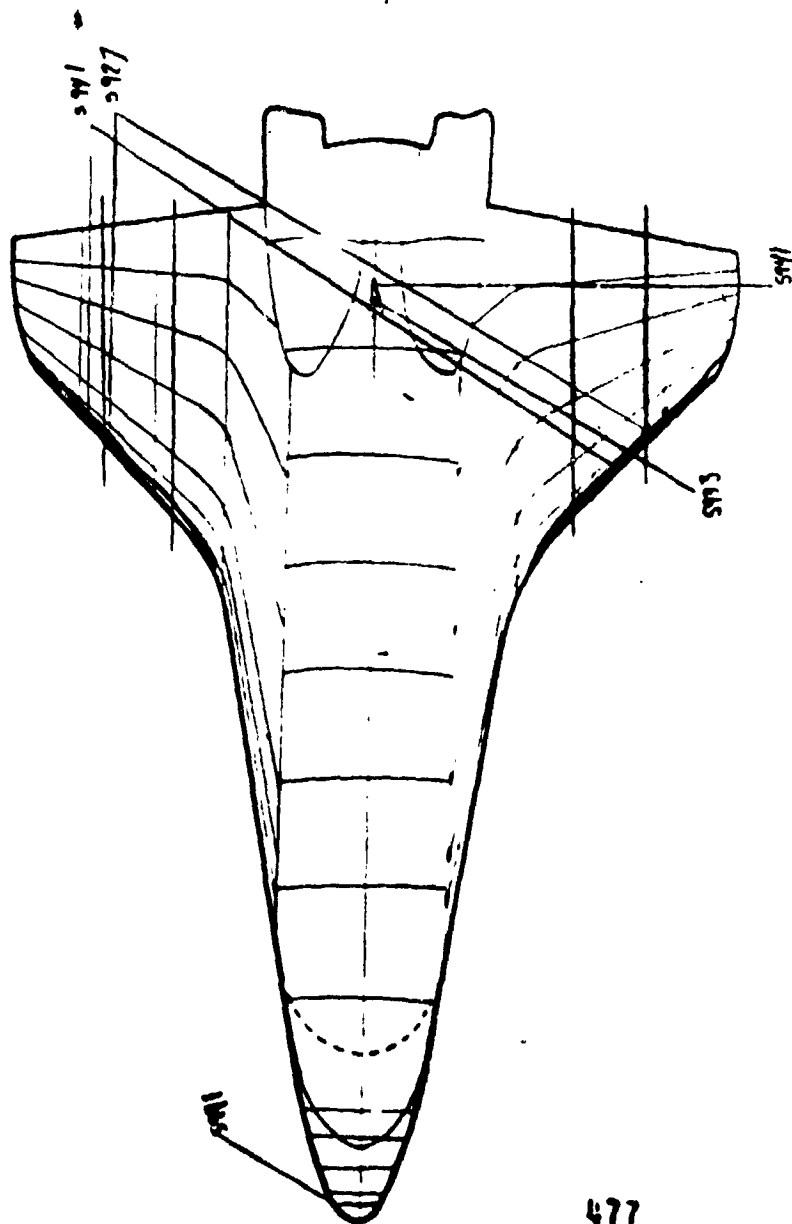


Figure 76

477



AFDCLAWO, INC.) ARNOLD AFS, TENNESSEE  
VON KARMAN GAS DYNAMICS FACILITY  
50 INCH HYPERSONIC TUNNEL A

**MASA-MI ORRITER PEATING**

WAS 200

GROUP	CONFID	MODEL	MACH NO	PO(PSTA)	TO(CEG R)	ALPHA-MODEL	ALPHA-SECTION	ALPHA-PREBEND	ROLL-MODEL	YAW
70	A	OMRTFFM 23	7.95	210.4	1274	30.02	-0.02	-20.00	-180.00	-0.00

T-1AF	P-1AF	O-1AF	V-1AF	RMU-1AF	MU-1AF	RF/1	MAFF	STNEF
DEG RI	(PSIA)	(PSIA)	(EI/SEC)	(SEC/EI3)	(LR=SEC/EI2)	(EI-1)	LR=	LR=
91.4	.922	.993	3704	7.017E-05	7.511E-04	1.010E 04	2.419E-02	4.050E-02

CAMERA	ROLL NO	PAINT ICMP (DGF F)	INITIAL TEMP (DGF F)	SQUARE ROOT (RHUACAK)	TBAR(TO)	BETA(TO)
8070	7550	300	81	.0544	2.989E-01	3.5068E-01

PIC NO	TIME	DELTIME	MITOS	MITO/MMEF	M.(910)	M.(910I)/MMEF	M.(912U)	M.(912TO)/MMEF	ST(110)
M 592413001	10.71	9.62	6.219E-03	.2569	8.109E-03	.3125	7.811E-03	.3203	1.014E-02
I 1000313001	10.74	9.64	6.207E-03	.2566	8.098E-03	.3121	7.801E-03	.3199	1.013E-02
S 359213001	10.74	9.64	6.207E-03	.2566	8.098E-03	.3121	7.801E-03	.3199	1.013E-02
I 1000413001	11.79	10.54	5.889E-03	.2415	7.625E-03	.3151	7.400E-03	.3035	9.610E-03
S 343131001	11.79	10.50	5.889E-03	.2415	7.625E-03	.3151	7.400E-03	.3035	9.610E-03
M 592513001	11.79	10.54	5.889E-03	.2415	7.625E-03	.3151	7.400E-03	.3035	9.610E-03
I 1000513001	12.64	11.54	5.614E-03	.2302	7.324E-03	.3003	7.055E-03	.2893	9.157E-03
S 360413001	12.64	11.54	5.614E-03	.2302	7.324E-03	.3003	7.055E-03	.2893	9.157E-03
M 592613001	12.64	11.54	5.614E-03	.2302	7.324E-03	.3003	7.055E-03	.2893	9.157E-03
I 1000613001	13.69	12.66	5.315E-03	.2204	7.012E-03	.2875	6.754E-03	.2769	8.767E-03
S 340513001	13.62	12.62	5.309E-03	.2202	7.005E-03	.2872	6.747E-03	.2767	8.758E-03
M 592813001	14.56	13.65	5.166E-03	.2116	6.737E-03	.2781	6.489E-03	.2659	8.415E-03
I 1000713001	14.57	13.67	5.159E-03	.2116	6.730E-03	.2780	6.483E-03	.2658	8.414E-03
S 340613001	14.57	13.67	5.159E-03	.2116	6.730E-03	.2780	6.483E-03	.2658	8.414E-03
I 1000813001	16.02	14.71	4.971E-03	.2038	6.446E-03	.2659	6.247E-03	.2562	8.109E-03
S 340713001	16.02	14.71	4.971E-03	.2038	6.446E-03	.2659	6.247E-03	.2562	8.109E-03
M 593013001	16.02	14.71	4.971E-03	.2038	6.446E-03	.2659	6.247E-03	.2562	8.109E-03
I 1000913001	17.07	15.74	4.803E-03	.1969	6.266E-03	.2569	6.036E-03	.2474	7.830E-03
S 340813001	17.07	15.74	4.799E-03	.1967	6.261E-03	.2567	6.031E-03	.2472	7.824E-03
M 593113001	17.09	15.94	4.799E-03	.1967	6.261E-03	.2567	6.031E-03	.2472	7.824E-03
I 1001013001	18.15	16.86	4.667E-03	.1904	6.063E-03	.2484	5.840E-03	.2393	7.573E-03
S 340913001	18.15	16.86	4.667E-03	.1904	6.063E-03	.2485	5.840E-03	.2393	7.573E-03
M 593213001	18.15	16.86	4.667E-03	.1904	6.063E-03	.2485	5.840E-03	.2393	7.573E-03
I 1001113001	19.20	17.94	4.508E-03	.1848	5.862E-03	.2411	5.666E-03	.2322	7.347E-03
S 341013001	19.20	17.94	4.508E-03	.1848	5.862E-03	.2411	5.666E-03	.2322	7.347E-03
M 593313001	19.20	17.94	4.508E-03	.1848	5.862E-03	.2411	5.666E-03	.2322	7.347E-03

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71 9173

MECCIARDI, INC.) ARNOLD AFS, TENNESSEE  
VON KARMAN GAS DYNAMICS FACILITY  
50 INCH HYPERSONIC TUNNEL R

VA280  
WAS-RI COVER PLATING

WAZ 99

GROUP	CMFTE	MODEL	MACH NO	PO(PSIA)	IN(IG R)	ALPHA-MODEL	ALPHA-SECTOR	ALPHA-PREEND	ROLL-MODEL	YAW
70	6	ORE1TFR R3	7.95	210.6	1274	30.02	-.02	-30.00	-180.00	-.00

CAMERA	ROLL NO	PAINT TEMP (DEG F)	INITIAL TEMP (DEG F)	SQUARE ROOT (RHOACAK)	TRAN(TO)	BETA(TO)
TOP(T)	7550					
SIDE(S)	8070	304	A)	.054	2.989E-01	3.5068E-01

PIC NO	TIME	RELTIME	M(T0)	M(T0)/MREF	M(T0)	M(T0)/MREF	M(T0)	M(T0)/MREF	M(T0)
5931(100)	20.25	18.94	4.312F-03	.1796	5.714E-03	.2343	5.503E-03	.2257	7.144E-03
5932(100)	20.27	18.98	4.319F-03	.1795	5.713E-03	.2342	5.503E-03	.2256	7.139E-03
5933(100)	20.27	18.98	4.319F-03	.1795	5.713E-03	.2342	5.503E-03	.2256	7.139E-03
5934(100)	21.32	20.03	4.262F-03	.1747	5.561E-03	.2279	5.356E-03	.2195	6.946E-03
5935(100)	21.32	20.03	4.262F-03	.1747	5.561E-03	.2279	5.356E-03	.2195	6.946E-03
5936(100)	21.32	20.03	4.262F-03	.1747	5.561E-03	.2279	5.356E-03	.2195	6.946E-03
5937(100)	21.32	20.03	4.262F-03	.1747	5.561E-03	.2279	5.356E-03	.2195	6.946E-03
5938(100)	22.28	21.08	4.155F-03	.1702	5.421E-03	.2221	5.221E-03	.2139	6.768E-03
5939(100)	22.28	21.08	4.155F-03	.1702	5.421E-03	.2221	5.221E-03	.2139	6.768E-03
5940(100)	22.28	21.08	4.155F-03	.1702	5.421E-03	.2221	5.221E-03	.2139	6.768E-03
5941(100)	22.28	21.08	4.155F-03	.1702	5.421E-03	.2221	5.221E-03	.2139	6.768E-03
5942(100)	23.45	22.14	4.053F-03	.1661	5.287E-03	.2147	5.093E-03	.2087	6.604E-03
5943(100)	23.45	22.14	4.053F-03	.1661	5.287E-03	.2147	5.093E-03	.2087	6.604E-03
5944(100)	23.45	22.14	4.053F-03	.1661	5.287E-03	.2147	5.093E-03	.2087	6.604E-03
5945(100)	24.50	23.21	3.940F-03	.1621	5.164E-03	.2117	4.976E-03	.2039	6.453E-03
5946(100)	24.50	23.21	3.940F-03	.1621	5.164E-03	.2117	4.976E-03	.2039	6.453E-03
5947(100)	24.53	23.24	3.944F-03	.1621	5.164E-03	.2115	4.973E-03	.2037	6.444E-03
5948(100)	25.55	24.26	3.813F-03	.1547	5.053E-03	.2070	4.867E-03	.1994	6.306E-03
5949(100)	25.55	24.26	3.813F-03	.1547	5.053E-03	.2070	4.867E-03	.1994	6.306E-03
5950(100)	25.58	24.29	3.811F-03	.1546	5.052E-03	.2069	4.865E-03	.1993	6.303E-03
5951(100)	26.63	25.34	3.749F-03	.1522	4.944E-03	.2025	4.763E-03	.1951	6.171E-03
5952(100)	26.63	25.34	3.749F-03	.1522	4.944E-03	.2025	4.763E-03	.1951	6.171E-03
5953(100)	26.63	25.34	3.749F-03	.1522	4.944E-03	.2025	4.763E-03	.1951	6.171E-03
5954(100)	26.66	25.37	3.647F-03	.1496	4.754E-03	.1949	4.583E-03	.1878	5.940E-03
5955(100)	26.66	25.37	3.647F-03	.1496	4.754E-03	.1949	4.583E-03	.1878	5.940E-03
5956(100)	26.66	25.37	3.647F-03	.1496	4.754E-03	.1949	4.583E-03	.1878	5.940E-03
5957(100)	30.69	29.39	3.519F-03	.1441	4.591E-03	.1900	4.422E-03	.1811	5.724E-03
5958(100)	30.69	29.39	3.519F-03	.1441	4.591E-03	.1900	4.422E-03	.1811	5.724E-03

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7/ 9/73

NASA-RI ORBITER HEATING

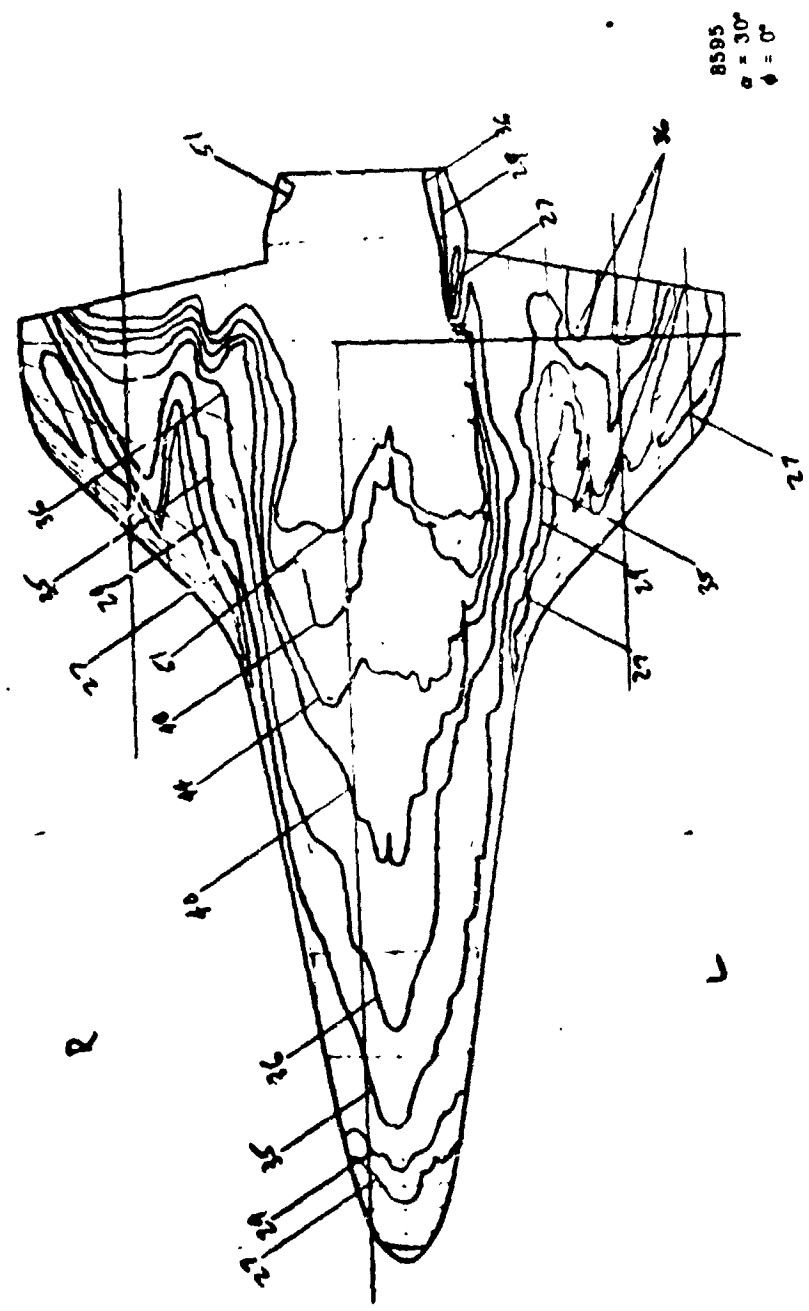
AEDCI(ARO-INC.) ARNOLD AFS, TENNESSEE  
 FOR KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL P

VA200

WPCUP COMPIC MODEL MACH NO PO(PSIA) TO(DEG R) ALPHA-A-MODEL ALPHA-SECTOR ALPHA-PREBEND ROLL-MODEL YAW  
 70 A ORBITER #3 7.05 211.0 1274 30.02 -.02 -30.00 -100.00 -.00  
 T-1NF P-1NF Q-1NF V-1NF RHO-1NF MU-1NF RE/FT MREF STREF  
 (DEG R) (PSIA) (PSIA) (FI/SEC) (SLUGS/FT<sup>3</sup>) (LH-SEC/FT<sup>2</sup>) (FT-LL) (RHO-0175ET) (RHO-0175ET)  
 93.4 .023 .996 3764 2.023E-05 7.510E-08 1.013E 06 2.442E-02 4.045E-02  
 CAMERA ROLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHOXCAK) TRAR(TO) BETA(TO)  
 TOP(1) 7950  
 SIDE(1) 0070 300  
 BOTTOM(1) 0421 .0504 2.989E-01 3.5060E-01

PTC MM TIME DELTIME M(TO) M(TO)/MREF M(L-9TO) M(L-9TO)/MREF M(-912TO) M(-912TO)/MREF ST(TO)  
 S 3699(100) 30.71 29.42 3.517E-03 1.046 4.589E-03 .1470 4.420E-03 .1010 5.724E-03  
 T 10021(100) 32.71 31.42 3.403E-03 .1393 4.440E-03 .1410 4.277E-03 .1751 5.534E-03  
 S 3700(100) 32.71 31.42 3.403E-03 .1393 4.440E-03 .1410 4.277E-03 .1751 5.534E-03  
 M 5042(100) 32.71 31.42 3.403E-03 .1393 4.440E-03 .1410 4.277E-03 .1751 5.534E-03  
 MODEL WAS LEFT CENTERLINE  
 T 10022(100) 30.74 33.45 3.299E-03 .1351 4.303E-03 .1762 4.145E-03 .1697 5.365E-03  
 M 5043(100) 30.74 33.45 3.299E-03 .1351 4.303E-03 .1762 4.145E-03 .1697 5.365E-03  
 S 3701(100) 30.76 33.47 3.297E-03 .1350 4.302E-03 .1761 4.144E-03 .1696 5.361E-03  
 T 10023(100) 30.77 35.47 3.245E-03 .1311 4.179E-03 .1711 4.025E-03 .1648 5.208E-03  
 S 3702(100) 30.77 35.47 3.245E-03 .1311 4.179E-03 .1711 4.025E-03 .1648 5.208E-03  
 M 5044(100) 30.77 35.47 3.245E-03 .1311 4.179E-03 .1711 4.025E-03 .1648 5.208E-03

Fig. 75



8585  
 $\alpha = 30^\circ$   
 $\phi = 0^\circ$

Figure 75

Group 71  
84 71  
NO

4528  
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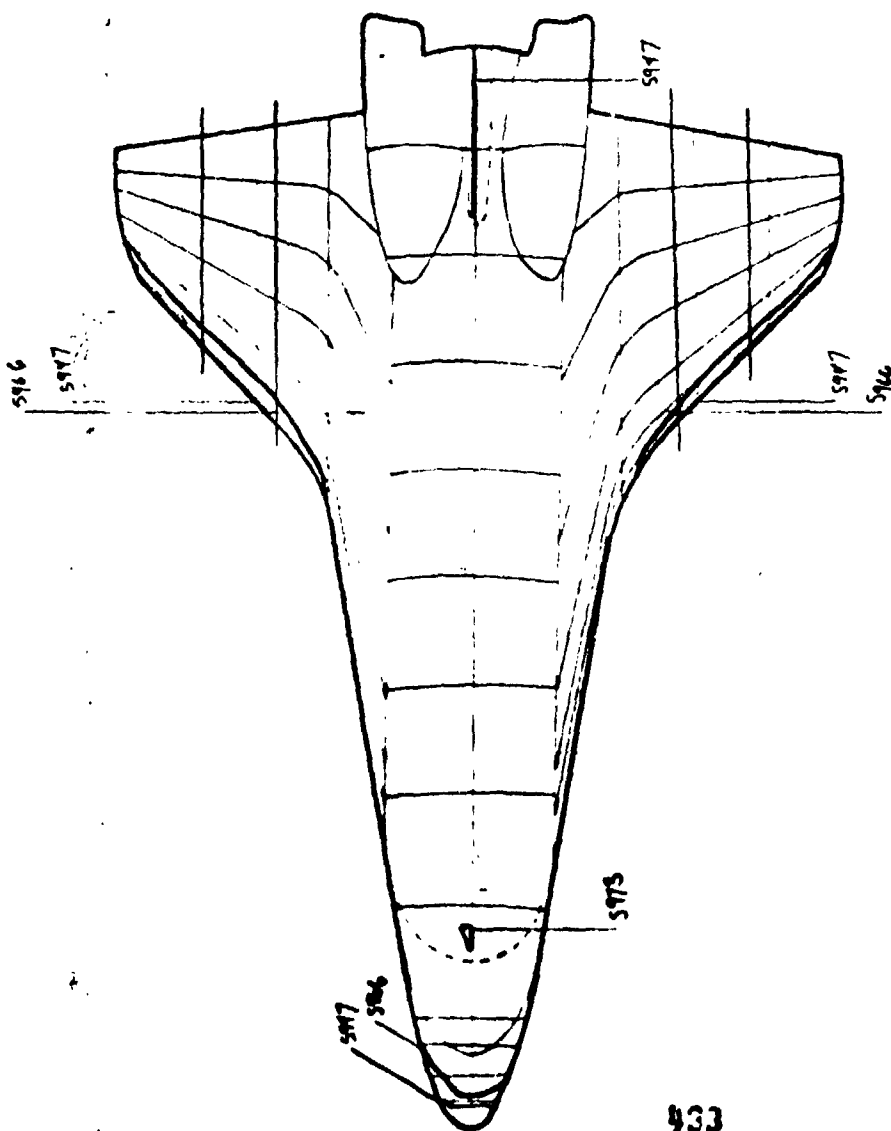


Figure 76





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7/ 9/73

AEDC(ARO, INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL R

NASA-RI ORBITER HEATING

VA289

GROUP CONFID MODEL MACH NO PO(PSIA) TO(DEG R) ALPHA-MODEL ALPHA-SECTION ALPHA-PREBEND ROLL-MODEL YAW  
 71 5 QREITER R2 7.95 209.9 1275 30.02 -.02 -30.00 -180.00 -.00

T-INF P-INF Q-INF V-INF MU-INF RHO-INF RE/FT MREF STREF  
 (DEG R) (PSIA) (PSIA) (FT/SEC) (SLUGS/FT3) (LB-SEC/FT2) (FI-1) (Pa .0175FI) (Pa .0175FI)  
 93.5 .022 .991 376A 2.010E-05 7.526E-08 1.006E 06 2.436E-02 4.059E-02

CAMERA ROLL NO PAINT IFMP (DFG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHOXCKX) TBAR(TO) BETA(TO)

TOP(T) 7550  
 SIDE(S) 8070 175 A1 .0509 1.280E-01 1.2637E-01  
 BOTTOM(B) 8471

PIC NO	TIME DELTME	H(TO)	M(TO)/MREF	H(.910)	M(.910)/MREF	H(.912TO)	M(.912TO)/MREF	ST(TO)
S 3711(175)	9.69	2.220E-03	.0911	2.755E-03	.1131	2.675E-02	.1098	3.650E-03
T 331(175)	10.74	2.093E-03	.0859	2.597E-03	.1066	2.521E-03	.1035	3.447E-03
S 3712(175)	10.74	2.093E-03	.0859	2.597E-03	.1066	2.521E-03	.1035	3.447E-03
M 5954(175)	10.74	2.093E-03	.0859	2.597E-03	.1066	2.521E-03	.1035	3.447E-03
M 5955(175)	11.79	1.945E-03	.0815	2.464E-03	.1011	2.392E-03	.0981	3.268E-03
T 341(175)	11.81	1.943E-03	.0814	2.461E-03	.1010	2.389E-03	.0981	3.266E-03
S 3713(175)	11.81	1.943E-03	.0814	2.461E-03	.1010	2.389E-03	.0981	3.266E-03
T 351(175)	12.66	1.841E-03	.0776	2.344E-03	.0963	2.278E-03	.0935	3.114E-03
S 3714(175)	12.66	1.841E-03	.0776	2.344E-03	.0963	2.278E-03	.0935	3.114E-03
M 5956(175)	12.66	1.841E-03	.0776	2.344E-03	.0963	2.278E-03	.0935	3.114E-03
T 361(175)	13.52	1.810E-03	.0743	2.247E-03	.0922	2.181E-03	.0895	2.979E-03
M 5957(175)	13.52	1.810E-03	.0743	2.247E-03	.0922	2.181E-03	.0895	2.979E-03
S 3715(175)	13.52	1.809E-03	.0742	2.244E-03	.0921	2.179E-03	.0894	2.976E-03
T 371(175)	14.59	1.738E-03	.0713	2.156E-03	.0885	2.094E-03	.0859	2.859E-03
S 3716(175)	14.59	1.738E-03	.0713	2.156E-03	.0885	2.094E-03	.0859	2.859E-03
M 5958(175)	14.59	1.738E-03	.0713	2.156E-03	.0885	2.094E-03	.0859	2.859E-03
M 5959(175)	16.04	1.675E-03	.0687	2.076E-03	.0852	2.018E-03	.0827	2.753E-03
T 381(175)	16.07	1.673E-03	.0687	2.076E-03	.0852	2.018E-03	.0827	2.753E-03
S 3717(175)	16.07	1.673E-03	.0687	2.076E-03	.0852	2.018E-03	.0827	2.753E-03
T 391(175)	17.12	1.517E-03	.0663	2.006E-03	.0823	1.948E-03	.0799	2.660E-03
S 3718(175)	17.12	1.517E-03	.0663	2.006E-03	.0823	1.948E-03	.0799	2.660E-03
M 5960(175)	17.12	1.517E-03	.0663	2.006E-03	.0823	1.948E-03	.0799	2.660E-03
T 401(175)	18.20	1.555E-03	.0642	1.941E-03	.0796	1.885E-03	.0773	2.572E-03
S 3719(175)	18.20	1.555E-03	.0642	1.941E-03	.0796	1.885E-03	.0773	2.572E-03
M 5961(175)	18.20	1.555E-03	.0642	1.941E-03	.0796	1.885E-03	.0773	2.572E-03

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7/ 9773

NASA-RI ORBITER HEATING

VA289

AEDC(AHO-INC.) ARNOLD AFS, TENNESSEE

VON KARMAN GAS DYNAMICS FACILITY

50 INCH HYPERSONIC TUNNEL R

PRO-IP CONFIG MODEL MACH NO PO(P(SIA) T(°(R) ALPHA-MODEL ALPHA-SECTION ALPHA-PREBEND ROLL-MODEL YAW  
71 5 ORBITER R2 7.95 210.3 1275 20.02 -.02 -30.00 -180.00 -.00

T-INF P-INF Q-INF V-INF MU-INF MU-INF RE/FT MREF STREF  
(DEG R) (PSIA) (PSIA) (PSIA) (SLUGS/FT<sup>3</sup>) (LB-SEC/FT<sup>2</sup>) (FT-LB) (LB-0.175EI) (R-0.175EI)  
93.5 .022 .993 3768 2.114E-05 7.526E-08 1.000E 06 2.419E-02 4.054E-02

CAMERA POLL NO PAINT IFMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHOXCK) TRAR(TO) BETA(TO)  
TOP(T) 7950  
SIDE(S) 8070  
BOTTOM(B) 8471  
175 81 .0509 1.280E-01 1.2637E-01

PIC NO	TIME	TIME	M(TO)	M(TO)/MREF	M(010)	M(010)/MREF	M(01210)	M(01210)/MREF	ST(TO)
T 411(175)	19.25	17.95	1.518E-03	.0622	1.894E-03	.0772	1.829E-03	.0750	2.495E-03
M 5962(175)	19.25	17.95	1.518E-03	.0622	1.894E-03	.0772	1.829E-03	.0750	2.495E-03
S 3720(175)	19.27	17.94	1.511E-03	.0622	1.822E-03	.0772	1.827E-03	.0750	2.495E-03
T 421(175)	20.32	19.03	1.474E-03	.0605	1.830E-03	.0750	1.776E-03	.0729	2.425E-03
S 3721(175)	20.32	19.03	1.474E-03	.0605	1.830E-03	.0750	1.776E-03	.0729	2.425E-03
M 5963(175)	20.32	19.03	1.474E-03	.0605	1.830E-03	.0750	1.776E-03	.0729	2.425E-03
S 3722(175)	21.37	20.08	1.435E-03	.0589	1.781E-03	.0730	1.729E-03	.0709	2.359E-03
T 431(175)	21.40	20.11	1.421E-03	.0588	1.780E-03	.0730	1.728E-03	.0709	2.358E-03
M 5964(175)	21.40	20.11	1.421E-03	.0588	1.780E-03	.0730	1.728E-03	.0709	2.358E-03
S 3723(175)	22.45	21.16	1.374E-03	.0574	1.735E-03	.0712	1.685E-03	.0691	2.300E-03
T 441(175)	22.48	21.19	1.374E-03	.0573	1.734E-03	.0711	1.684E-03	.0690	2.297E-03
M 5965(175)	22.48	21.19	1.374E-03	.0573	1.734E-03	.0711	1.684E-03	.0690	2.297E-03
S 3724(175)	23.53	22.23	1.364E-03	.0559	1.693E-03	.0694	1.643E-03	.0674	2.242E-03
T 451(175)	23.53	22.23	1.364E-03	.0559	1.693E-03	.0694	1.643E-03	.0674	2.242E-03
M 5966(175)	23.53	22.23	1.364E-03	.0559	1.693E-03	.0694	1.643E-03	.0674	2.242E-03
S 3725(175)	24.58	23.28	1.333E-03	.0546	1.658E-03	.0678	1.606E-03	.0658	2.189E-03
T 461(175)	24.60	23.31	1.333E-03	.0546	1.658E-03	.0678	1.606E-03	.0658	2.189E-03
M 5967(175)	24.60	23.31	1.333E-03	.0546	1.658E-03	.0678	1.606E-03	.0658	2.189E-03
S 3726(175)	25.65	24.34	1.303E-03	.0534	1.617E-03	.0663	1.570E-03	.0644	2.142E-03
T 471(175)	25.65	24.34	1.303E-03	.0534	1.617E-03	.0663	1.570E-03	.0644	2.142E-03
M 5968(175)	25.65	24.34	1.303E-03	.0534	1.617E-03	.0663	1.570E-03	.0644	2.142E-03
S 3727(175)	26.66	25.36	1.258E-03	.0524	1.561E-03	.0643	1.516E-03	.0621	2.066E-03
T 481(175)	26.66	25.36	1.258E-03	.0524	1.561E-03	.0643	1.516E-03	.0621	2.066E-03
M 5969(175)	26.66	25.36	1.258E-03	.0524	1.561E-03	.0643	1.516E-03	.0621	2.066E-03
S 3728(175)	27.66	26.37	1.212E-03	.0497	1.504E-03	.0617	1.460E-03	.0599	1.991E-03
T 491(175)	27.66	26.37	1.212E-03	.0497	1.504E-03	.0617	1.460E-03	.0599	1.991E-03
M 5970(175)	27.66	26.37	1.212E-03	.0497	1.504E-03	.0617	1.460E-03	.0599	1.991E-03

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7/ 9/73

NASA-RI ORBITER HEATING

AFDCA(HQ-INC.) ARNOLD AFB, TENNESSEE

VON KARMAN GAS DYNAMICS FACILITY

50 INCH HYPERSONIC TUNNEL R

VA289

GROUP CONFIG MODEL MACH NO PO(P(SIA) TO(DEG R) ALPHA-MODEL ALPHA-SECTION ALPHA-PREBEND ROLL-MODEL YAW

71 5 ORBITER R2 7.95 210.4 1275 30.02 .02 -30.00 -180.00 -0.00

T-INF P-INF Q-INF V-INF MU-INF MU-INF MU-INF HREF STREF  
 (DEG R) (PSIA) (PSIA) (FT/SEC) (SLUGS/FT3) (LW-SEC/FT2) (FT-1) (M2 .0175FI) (M2 .0175FI)

91.5 .022 .993 3766 2.015F-05 7.525F-08 1.009E 05 2.479E-02 4.053E-02

CAMERA ROLL NO PAINT IFMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHOXCK) TBAR(TO) BETA(TO)

TOP(IT) 7950 175 81 .0509 1.280E-01 1.2637E-01

MOI(M/R) 8471

PIC NO TIME DELTIME HITO) HITO)/HREF M(,910) M(,910) MI .912TO) MI .912TO)/HREF ST(TO)

T 501(175) 31.46 30.17 1.171F-03 .0480 1.453E-03 .0596 1.411E-03 .0578 1.922E-03

S 3729(175) 31.46 30.17 1.171F-03 .0480 1.453E-03 .0596 1.411E-03 .0578 1.922E-03

M 4971(175) 31.46 30.17 1.171F-03 .0480 1.453E-03 .0596 1.411E-03 .0578 1.922E-03

T 511(175) 32.49 32.21 1.134E-03 .0465 1.407E-03 .0576 1.364E-03 .0560 1.861E-03

M 5972(175) 32.49 32.21 1.134E-03 .0465 1.407E-03 .0576 1.364E-03 .0560 1.861E-03

S 3730(175) 32.51 32.22 1.133E-03 .0464 1.406E-03 .0576 1.365E-03 .0559 1.860E-03

M 5573(175) 35.52 34.22 1.100F-03 .0450 1.364E-03 .0559 1.325E-03 .0543 1.804E-03

T 521(175) 35.54 34.25 1.099F-03 .0450 1.364E-03 .0559 1.324E-03 .0543 1.805E-03

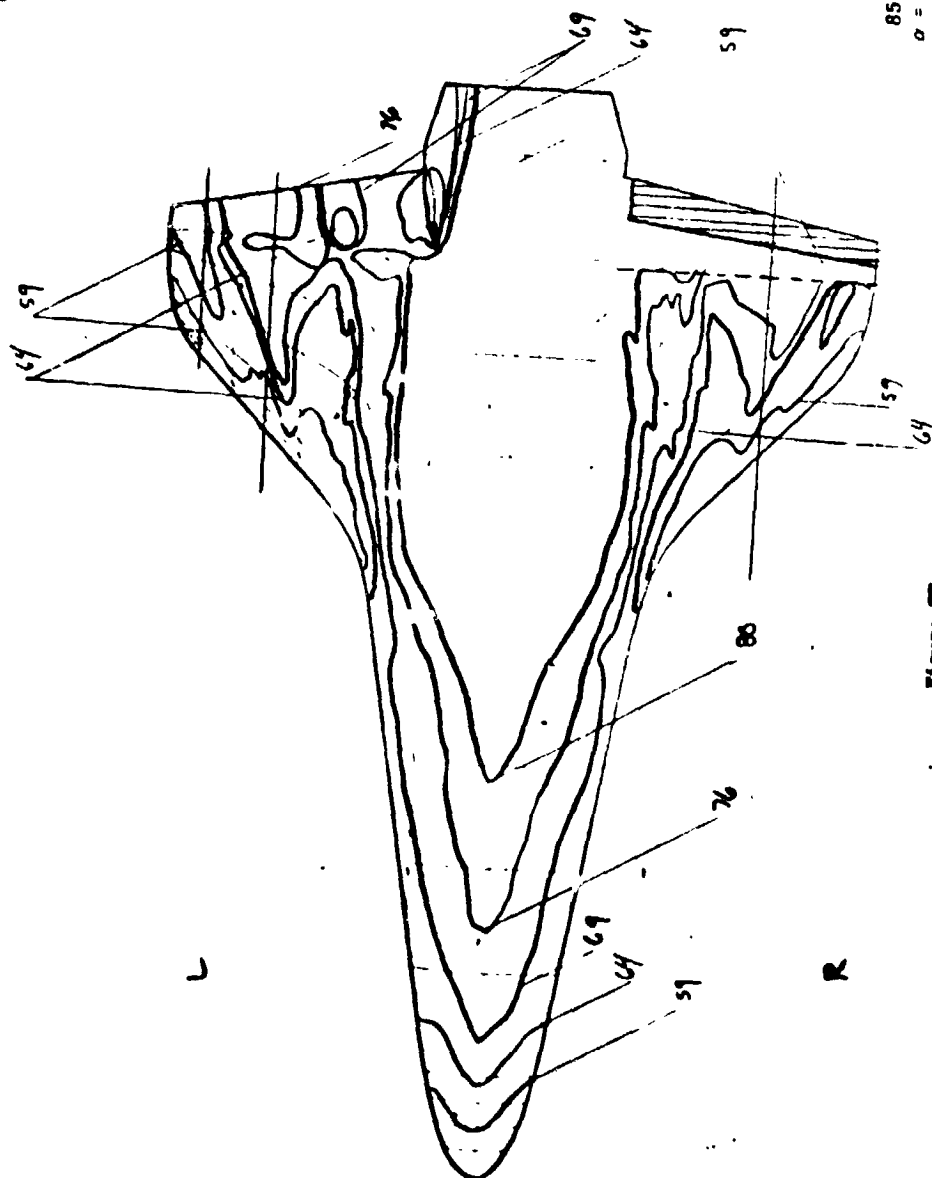
S 3731(175) 35.54 34.25 1.099F-03 .0450 1.364E-03 .0559 1.324E-03 .0543 1.805E-03

T 531(175) 37.57 36.28 1.068F-03 .0438 1.325E-03 .0543 1.287E-03 .0527 1.753E-03

S 3732(175) 37.57 36.28 1.068F-03 .0438 1.325E-03 .0543 1.287E-03 .0527 1.753E-03

M 5974(175) 37.57 36.28 1.068F-03 .0438 1.325E-03 .0543 1.287E-03 .0527 1.753E-03

Group 72  
7950  
MF  
Σ 110012



8595  
 $\alpha = 30^\circ$   
 $\phi = 0^\circ$

Figure 77





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7/ 9/73

MASA-RI ORBITER HEATING

AEDC(ARO-INC.) ARNOLD AFS, TENNESSEE

VON KARMAN GAS DYNAMICS FACILITY

50 INCH HYPERSONIC TUNNEL R

VA2M9

GROUP CMFTG MODEL MACH NO PN(PSIA) TO( DEG R) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREBEND ROLL-MODEL YAW  
72 3 CREITER E 7.95 200.4 1276 30.02 -0.02 -30.00 -180.00 -0.00

T-1NF P-1NF Q-1NF V-1NF RHO-1NF MU-1NF RE/FT MREF STREF

(DEG R) (PSIA) (FT/SEC) (SLUGS/FT<sup>3</sup>) (LB-SEC/FT<sup>2</sup>) (FT-1) (R= .0175FT) (R= .0175FT)

93.5 .022 .988 3767 2.004E-05 7.530F-08 1.003E 06 2.414E-02 4.064E-02

CAMFRA ROLL NO PAINT TFP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHOXCRK) TRAN(ITO) BETA(ITO)

TOP(IT) 7960 79

SIDE(S) 8070 .9519 1.642E-01 1.6763E-01

MOTION(R) 8471

PIC NO	TIME DELT	H(ITO)	M(ITO)/MREF	H(.910)	M(.910)/MREF	H(.912TO)	M(.912TO)/MREF	ST(ITO)
M 5984(200)	10.74	9.44	2.811E-03	1.539E-03	1.454	3.433E-03	1.410	4.666E-03
T 631(200)	10.76	9.47	2.827E-03	1.535E-03	1.452	3.428E-03	1.409	4.662E-03
S 3742(200)	10.78	9.47	2.827E-03	1.535E-03	1.452	3.428E-03	1.409	4.662E-03
T 64(200)	11.01	10.52	2.842E-03	1.533E-03	1.478	3.253E-03	1.336	4.423E-03
S 3743(200)	11.01	10.52	2.842E-03	1.533E-03	1.478	3.253E-03	1.336	4.423E-03
M 5985(200)	11.01	10.52	2.842E-03	1.533E-03	1.478	3.253E-03	1.336	4.423E-03
T 65(200)	12.09	11.64	2.555E-03	1.194E-03	1.312	3.094E-03	1.272	4.209E-03
S 3744(200)	12.09	11.64	2.555E-03	1.194E-03	1.312	3.094E-03	1.272	4.209E-03
M 5986(200)	12.09	11.64	2.555E-03	1.194E-03	1.312	3.094E-03	1.272	4.209E-03
T 66(200)	13.54	12.65	2.446E-03	1.054E-03	1.256	2.964E-03	1.218	4.028E-03
M 5987(200)	13.54	12.65	2.446E-03	1.054E-03	1.256	2.964E-03	1.218	4.028E-03
S 3745(200)	13.57	12.67	2.446E-03	1.054E-03	1.256	2.964E-03	1.218	4.028E-03
T 67(200)	15.02	13.72	2.344E-03	1.094E-03	1.205	2.844E-03	1.169	3.865E-03
S 3746(200)	15.02	13.72	2.344E-03	1.094E-03	1.205	2.844E-03	1.169	3.865E-03
M 5988(200)	15.02	13.72	2.344E-03	1.094E-03	1.205	2.844E-03	1.169	3.865E-03
T 68(200)	16.07	14.78	2.263E-03	1.042E-03	1.141	2.745E-03	1.126	3.722E-03
M 5989(200)	16.09	14.80	2.261E-03	1.042E-03	1.140	2.742E-03	1.125	3.718E-03
S 3747(200)	16.09	14.80	2.261E-03	1.042E-03	1.140	2.742E-03	1.125	3.718E-03
T 69(200)	17.14	15.85	2.145E-03	1.094E-03	1.121	2.650E-03	1.087	3.592E-03
S 3748(200)	17.14	15.85	2.145E-03	1.094E-03	1.121	2.650E-03	1.087	3.592E-03
M 5990(200)	17.14	15.85	2.145E-03	1.094E-03	1.121	2.650E-03	1.087	3.592E-03
T 70(200)	18.20	16.91	2.114E-03	1.046E-03	1.085	2.566E-03	1.052	3.474E-03
M 5991(200)	18.20	16.91	2.114E-03	1.046E-03	1.085	2.566E-03	1.052	3.474E-03
S 3749(200)	18.22	16.93	2.114E-03	1.046E-03	1.085	2.566E-03	1.051	3.470E-03
T 71(200)	19.27	17.92	2.052E-03	1.041E-03	1.051	2.484E-03	1.020	3.366E-03
S 3750(200)	19.27	17.92	2.052E-03	1.041E-03	1.051	2.484E-03	1.020	3.366E-03
M 5992(200)	19.27	17.92	2.052E-03	1.041E-03	1.051	2.484E-03	1.020	3.366E-03

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MECCARD, INC.) ANNULU AFS. TENNESSEE  
VON KAMMA GAS DYNAMICS FACILITY  
50 INCH HYPERSONIC TUNNEL

# MASSACHUSETTS WRITER FEATURING

**6727**

[illegible]

PIC NO	TIME	DELTIME	W(TOI)	W(TOI)/HREF	W(010)	W(TOI)/HREF	W(010)/HREF	W(-012TOI)	W(-012TOI)/HREF	ST(10)
4	5593(200)	20.32	19.07	1.904E-03	0.0417	2.493E-03	0.1022	2.418E-03	0.0981	3.273F-03
7	72(200)	20.35	18.04	1.903F-03	0.0417	2.492E-03	0.1021	2.417E-03	0.0981	3.271F-03
5	3751(200)	20.25	18.04	1.903F-03	0.0417	2.492E-03	0.1021	2.417E-03	0.0981	3.271E-03
8	73(200)	21.40	20.11	1.900F-03	0.0795	2.426E-03	0.0994	2.353E-03	0.0964	3.183E-03
6	3752(200)	21.40	20.11	1.900F-03	0.0795	2.426E-03	0.0994	2.353E-03	0.0964	3.183E-03
4	5948(200)	21.40	20.11	1.900F-03	0.0795	2.426E-03	0.0994	2.353E-03	0.0964	3.183E-03
4	5945(200)	22.48	21.14	1.891F-03	0.0775	2.363E-03	0.0969	2.294E-03	0.0940	3.103E-03
8	74(200)	22.48	21.14	1.890F-03	0.0774	2.362E-03	0.0968	2.292E-03	0.0939	3.099F-03
5	3753(200)	22.48	21.12	1.890F-03	0.0774	2.362E-03	0.0968	2.292E-03	0.0939	3.099E-03
7	75(200)	26.13	25.84	1.891F-03	0.0746	2.274E-03	0.0933	2.204E-03	0.0905	2.985E-03
6	3754(200)	26.13	25.84	1.891F-03	0.0746	2.274E-03	0.0933	2.204E-03	0.0905	2.985E-03
4	5596(200)	26.13	25.84	1.891F-03	0.0746	2.274E-03	0.0933	2.204E-03	0.0905	2.985E-03
7	76(200)	26.14	25.84	1.894E-03	0.0715	2.111E-03	0.0894	2.116E-03	0.0867	2.861E-03
6	3755(200)	26.16	25.84	1.894E-03	0.0715	2.111E-03	0.0894	2.116E-03	0.0867	2.861F-03
8	5597(200)	26.14	25.84	1.894E-03	0.0715	2.111E-03	0.0894	2.116E-03	0.0867	2.861E-03
7	77(200)	26.18	25.84	1.894E-03	0.0647	2.094E-03	0.0859	2.035E-03	0.0834	2.751E-03
4	5594(200)	26.18	25.84	1.894E-03	0.0647	2.094E-03	0.0859	2.035E-03	0.0834	2.751F-03
5	3756(200)	26.21	25.91	1.897F-03	0.0697	2.097E-03	0.0859	2.034E-03	0.0833	2.748E-03
4	5594(200)	30.21	25.92	1.891F-03	0.0663	2.073E-03	0.0829	1.962E-03	0.0803	2.651E-03
7	78(200)	30.23	25.44	1.891E-03	0.0662	2.072E-03	0.0828	1.961E-03	0.0803	2.650F-03
5	3757(200)	30.23	25.94	1.891F-03	0.0562	2.022E-03	0.0828	1.961E-03	0.0803	2.650E-03
7	79(200)	32.26	31.97	1.903E-03	0.0640	1.954E-03	0.0800	1.894E-03	0.0776	2.561F-03
6	3758(200)	32.26	31.97	1.903E-03	0.0640	1.954E-03	0.0800	1.894E-03	0.0776	2.561E-03
4	5900(200)	32.24	31.97	1.903E-03	0.0640	1.954E-03	0.0800	1.894E-03	0.0776	2.561E-03
7	80(200)	32.24	31.97	1.903E-03	0.0629	1.954E-03	0.0775	1.893E-03	0.0752	2.476E-03

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7/ 9/73

AFDC/AMN, INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL R

NASA-R1 ORBITER PEATING  
 VA289

GROUP CONFID MODEL MACH NO TO(DEC R) ALPHA-MODEL ALPHA-SECTION ALPHA-PREBEND ROLL-MODEL YAW  
 72 7 CHUTE E 7.95 211.3 1276 30.02 -0.02 -30.00 -100.00 -0.00  
 T-INF P-INF U-INF V-INF RMO-INF MU-INF RF/FT MREF STREF  
 (DEC R) (PSTA) (PSTA) (FT/SEC) (SLINGS/FT) (LH-SEC/FT) (FT-1) (R= .0175F1) (H= .0175F1)  
 93.8 .023 .997 3767 2.022F-05 7.530F-04 1.012E 04 2.445E-02 4.044E-02  
 CAMERA ROLL MU PAINT IFMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (MMOZAK) TRAR(TO) BETA(TO)  
 TOP(IT) 7550  
 SIZE(SI) 8070  
 MOTTCM(R) M971 200 79 .0519 1.642E-01 1.6763E-01

PIC NO TIME DELTIME H(TO) M(TO)/MREF M(C-910) M1-9101/MREF M1-91201/MREF ST(TO)  
 T R012001 34.29 33.00 1.515F-03 .0620 1.893E-03 .0776 1.837E-03 .0752 2.482E-03  
 S 775012001 34.29 33.00 1.515F-03 .0620 1.893E-03 .0776 1.837E-03 .0752 2.482E-03  
 MODEL HAS LEFT CENTERLINE

200

433

7450  
0873  
566

8595  
 $\alpha = 30^\circ$   
 $\phi = 0^\circ$

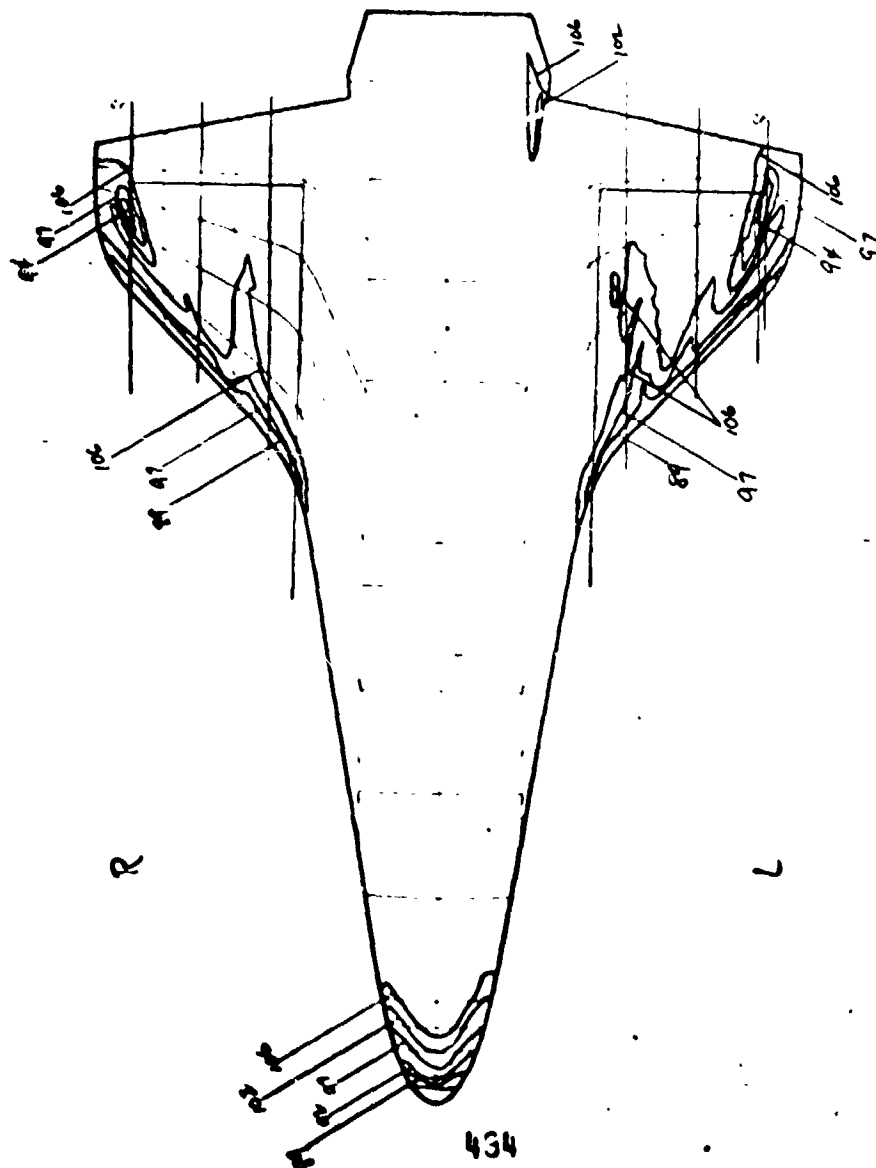


Figure 79

71 9173

941A734 0311000 18-05570

WY299

MECCARO, INC.) ANNUL AFS, TENNESSEE  
VON KARMAN GAS DYNAMICS FACILITY  
50 INCH HYPERSONIC TUNNEL

71 9173

GROUP	CNMT6	MODEL	MACH NO	PO(PSIA)	TO( DEG R)	ALPHA-MODEL	ALPHA-SECTOR	ALPHA-PREBEND	ROLL-MODEL	YAW
73	7	ORBITER R4	7.95	211.2	1276	30.02	-.02	-30.00	-100.00	-.00

T-1nf	Q-1nf	V-1nf	RNO-1nf	MU-1nf	RF/FT	MREF	S1REF
(DEG M)	(NSTAD)	(FT/2 <sup>-1</sup> )	(SLHMS/FT)	(LP-SEC/FT)	(F1-1)	(R=.0175F1)	(R=.0175F1)
93.4	.023	.097	2.020E-05	7.530E-04	1.011E 06	2.440E-02	6.040E-02

RAWFRA	ROLL NO	PAINT TEMP (DEG F)	INITIAL TEMP (DEG F)	SQUARE ROOT (RMO/CAK)	TRAR(TO)	BETA(TO)
TOP(T)	7958					
SINE(1)	8070	389	76	.0544		0
COTTON(18)	8471					

PIC NO	TIME	DELTIME	M(TO)/MREF	M(.9TO)	M(.9TO)/MREF	M(.912TO)	M(.912TO)/MREF	ST(10)
1	1.00	0.00	1.000	1.000	1.000	1.000	1.000	1.000
2	1.00	0.00	1.000	1.000	1.000	1.000	1.000	1.000
3	1.00	0.00	1.000	1.000	1.000	1.000	1.000	1.000
4	1.00	0.00	1.000	1.000	1.000	1.000	1.000	1.000
5	1.00	0.00	1.000	1.000	1.000	1.000	1.000	1.000
6	1.00	0.00	1.000	1.000	1.000	1.000	1.000	1.000
7	1.00	0.00	1.000	1.000	1.000	1.000	1.000	1.000
8	1.00	0.00	1.000	1.000	1.000	1.000	1.000	1.000
9	1.00	0.00	1.000	1.000	1.000	1.000	1.000	1.000
10	1.00	0.00	1.000	1.000	1.000	1.000	1.000	1.000
11	1.00	0.00	1.000	1.000	1.000	1.000	1.000	1.000
12	1.00	0.00	1.000	1.000	1.000	1.000	1.000	1.000
13	1.00	0.00	1.000	1.000	1.000	1.000	1.000	1.000
14	1.00	0.00	1.000	1.000	1.000	1.000	1.000	1.000
15	1.00	0.00	1.000	1.000	1.000	1.000	1.000	1.000
16	1.00	0.00	1.000	1.000	1.000	1.000	1.000	1.000
17	1.00	0.00	1.000	1.000	1.000	1.000	1.000	1.000
18	1.00	0.00	1.000	1.000	1.000	1.000	1.000	1.000
19	1.00	0.00	1.000	1.000	1.000	1.000	1.000	1.000
20	1.00	0.00	1.000	1.000	1.000	1.000	1.000	1.000
21	1.00	0.00	1.000	1.000	1.000	1.000	1.000	1.000
22	1.00	0.00	1.000	1.000	1.000	1.000	1.000	1.000
23	1.00	0.00	1.000	1.000	1.000	1.000	1.000	1.000
24	1.00	0.00	1.000	1.000	1.000	1.000	1.000	1.000
25	1.00	0.00	1.000	1.000	1.000	1.000	1.000	1.000
26	1.00	0.00	1.000	1.000	1.000	1.000	1.000	1.000
27	1.00	0.00	1.000	1.000	1.000	1.000	1.000	1.000
28	1.00	0.00	1.000	1.000	1.000	1.000	1.000	1.000
29	1.00	0.00	1.000	1.000	1.000	1.000	1.000	1.000
30	1.00	0.00	1.000	1.000	1.000	1.000	1.000	1.000
31	1.00	0.00	1.000	1.000	1.000	1.000	1.000	1.000
32	1.00	0.00	1.000	1.000	1.000	1.000	1.000	1.000
33	1.00	0.00	1.000	1.000	1.000	1.000	1.000	1.000
34	1.00	0.00	1.000	1.000	1.000	1.000	1.000	1.000
35	1.00	0.00	1.000	1.000	1.000	1.000	1.000	1.000
36	1.00	0.00	1.000	1.000	1.000	1.000	1.000	1.000
37	1.00	0.00	1.000	1.000	1.000	1.000	1.000	1.000
38	1.00	0.00	1.000	1.000	1.000	1.000	1.000	1.000
39	1.00	0.00	1.000	1.000	1.000	1.000	1.000	1.000
40	1.00	0.00	1.000	1.000				

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7/ 9/73

# NASA-RI ORBITER PEATING

AECC(ARO, INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL R

VA240

GROUP CAMPTE MODEL MACH NO PO(P/SIA) T/IDEG R1 ALPHA-MODEL ALPHA-SECTION ALPHA-PREBEND ROLL-MODEL YAW  
 71 7 ORBITER R4 7.95 211.7 1277 30.07 -.07 -30.00 -100.00 -.00

T-1AF P-1AF Q-1AF V-1AF RMO-1AF MU-1AF RE/FT MREF STREF  
 (DEG R) (DEG A) (DEG A) (FT/SEC) (SLUGS/FT<sup>3</sup>) (LBS-SEC/FT<sup>3</sup>) (FI-1) (R=.0175FI) (R=.0175FI)  
 01.6 .023 .990 3750 7.025E-05 7.530E-08 1.013E 06 2.447E-02 4.044E-02

CAMERA ROLL NO PAINT IFMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHO/CXK) TRAITO) RETAITO)  
 TOP(T) 7550 300 78 .0544 3.007E-01 3.5336E-01  
 SINF(S) 8070  
 MOTION(R) 8471

PIC NO	TYPE	DELTIME	M(TO)/MREF	M(-9TO)/MREF	M(-912TO)	M(-912TO)/MREF	ST(ITO)
1 1704(100)	9.49	8.41	4.630E-03	4.630E-03	4.630E-03	4.630E-03	1.077E-02
2 1704(100)	10.71	8.43	4.630E-03	4.630E-03	4.630E-03	4.630E-03	1.077E-02
3 1704(100)	10.74	8.44	4.630E-03	4.630E-03	4.630E-03	4.630E-03	1.077E-02
4 1704(100)	10.74	8.44	4.630E-03	4.630E-03	4.630E-03	4.630E-03	1.077E-02
5 1704(100)	11.79	10.51	4.630E-03	4.630E-03	4.630E-03	4.630E-03	1.077E-02
6 1704(100)	11.79	10.51	4.630E-03	4.630E-03	4.630E-03	4.630E-03	1.077E-02
7 1704(100)	11.79	10.51	4.630E-03	4.630E-03	4.630E-03	4.630E-03	1.077E-02
8 1704(100)	11.79	10.51	4.630E-03	4.630E-03	4.630E-03	4.630E-03	1.077E-02
9 1704(100)	12.04	11.50	4.630E-03	4.630E-03	4.630E-03	4.630E-03	1.077E-02
10 1704(100)	12.04	11.50	4.630E-03	4.630E-03	4.630E-03	4.630E-03	1.077E-02
11 1704(100)	12.04	11.50	4.630E-03	4.630E-03	4.630E-03	4.630E-03	1.077E-02
12 1704(100)	12.04	11.50	4.630E-03	4.630E-03	4.630E-03	4.630E-03	1.077E-02
13 1704(100)	13.52	12.64	4.630E-03	4.630E-03	4.630E-03	4.630E-03	1.077E-02
14 1704(100)	13.52	12.64	4.630E-03	4.630E-03	4.630E-03	4.630E-03	1.077E-02
15 1704(100)	13.52	12.64	4.630E-03	4.630E-03	4.630E-03	4.630E-03	1.077E-02
16 1704(100)	13.52	12.64	4.630E-03	4.630E-03	4.630E-03	4.630E-03	1.077E-02
17 1704(100)	14.57	13.60	4.630E-03	4.630E-03	4.630E-03	4.630E-03	1.077E-02
18 1704(100)	14.57	13.60	4.630E-03	4.630E-03	4.630E-03	4.630E-03	1.077E-02
19 1704(100)	14.57	13.60	4.630E-03	4.630E-03	4.630E-03	4.630E-03	1.077E-02
20 1704(100)	14.57	13.60	4.630E-03	4.630E-03	4.630E-03	4.630E-03	1.077E-02
21 1704(100)	16.04	14.74	4.630E-03	4.630E-03	4.630E-03	4.630E-03	1.077E-02
22 1704(100)	16.04	14.74	4.630E-03	4.630E-03	4.630E-03	4.630E-03	1.077E-02
23 1704(100)	16.04	14.74	4.630E-03	4.630E-03	4.630E-03	4.630E-03	1.077E-02
24 1704(100)	16.04	14.74	4.630E-03	4.630E-03	4.630E-03	4.630E-03	1.077E-02
25 1704(100)	17.09	15.82	4.630E-03	4.630E-03	4.630E-03	4.630E-03	1.077E-02
26 1704(100)	17.09	15.82	4.630E-03	4.630E-03	4.630E-03	4.630E-03	1.077E-02
27 1704(100)	17.09	15.82	4.630E-03	4.630E-03	4.630E-03	4.630E-03	1.077E-02
28 1704(100)	17.09	15.82	4.630E-03	4.630E-03	4.630E-03	4.630E-03	1.077E-02
29 1704(100)	18.15	16.87	4.630E-03	4.630E-03	4.630E-03	4.630E-03	1.077E-02
30 1704(100)	18.15	16.87	4.630E-03	4.630E-03	4.630E-03	4.630E-03	1.077E-02
31 1704(100)	18.15	16.87	4.630E-03	4.630E-03	4.630E-03	4.630E-03	1.077E-02
32 1704(100)	18.15	16.87	4.630E-03	4.630E-03	4.630E-03	4.630E-03	1.077E-02

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## NASA-11 ORBITER HEATING

VA289

AEDC (ARO, INC.) ARNOLD AFS, TENNESSEE  
VON KARMAN GAS DYNAMICS FACILITY  
50 INCH HYPERSONIC TUNNEL 8

7/ 5/73

GROUP CONFIG MODEL MACH NO PO (PSIA) TO (DEG R) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREBEND ROLL-MODEL YAW  
73 7 ORBITER R4 7.95 212.0 1276 30.02 -.02 -30.00 -180.00 -.00

T-1AF P-1NF Q-1NF RHO-1NF MU-1NF RE/FT HREF STREF  
(DEG R) (PSIA) (FT/SEC) (SLUGS/FT<sup>3</sup>) (LB-SEC/FT<sup>2</sup>) (FT<sup>2</sup>) (R<sub>g</sub> .0175EI) (R<sub>g</sub> .0175EI)  
93.6 .023 1.001 3758 2.078E-05 7.534E-08 1.014E 06 2.449E-02 4.040E-02

CAMERA ROLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHOCXK) T8AR(TO) BETA(TO)  
TOP(T) 7950 300 78 .0544 3.007E-01 3.5336E-01  
SIDE(S) 8070  
MOT(M/R) 8471

PIC NO TIME DELTIME H(TO) H(TO)/HREF H(.910) H(.910)/HREF H(.912TO) H(.912TO)/HREF ST(TO)

T 981(300)	19.22	17.94	4.538E-03	1853	5.914E-03	.2415	5.698E-03	.2327	7.353E-03
M 6019(300)	19.22	17.94	4.538E-03	1853	5.914E-03	.2415	5.698E-03	.2327	7.353E-03
S 3777(300)	19.22	17.94	4.538E-03	1853	5.914E-03	.2415	5.698E-03	.2327	7.353E-03
M 6020(300)	20.27	18.99	4.411E-03	1801	5.748E-03	.2346	5.538E-03	.2261	7.144E-03
T 991(300)	20.27	18.99	4.411E-03	1801	5.748E-03	.2346	5.538E-03	.2261	7.144E-03
S 3778(300)	20.27	18.99	4.411E-03	1801	5.748E-03	.2346	5.538E-03	.2261	7.144E-03
T 1001(300)	21.35	20.07	4.241E-03	1752	5.591E-03	.2283	5.388E-03	.2199	6.950E-03
S 3779(300)	21.35	20.07	4.241E-03	1752	5.591E-03	.2283	5.388E-03	.2199	6.950E-03
M 6021(300)	21.35	20.07	4.241E-03	1752	5.591E-03	.2283	5.388E-03	.2199	6.950E-03
T 1011(300)	22.83	21.55	4.141E-03	1693	5.396E-03	.2206	5.200E-03	.2125	6.723E-03
M 6022(300)	22.83	21.55	4.141E-03	1693	5.396E-03	.2206	5.200E-03	.2125	6.723E-03
S 3780(300)	22.83	21.55	4.141E-03	1693	5.396E-03	.2206	5.200E-03	.2125	6.723E-03
T 1021(300)	24.85	23.57	3.959E-03	1615	5.159E-03	.2105	4.971E-03	.2028	6.407E-03
M 6023(300)	24.85	23.57	3.959E-03	1615	5.159E-03	.2105	4.971E-03	.2028	6.407E-03
S 3781(300)	24.85	23.57	3.959E-03	1615	5.159E-03	.2105	4.971E-03	.2028	6.407E-03
T 1031(300)	26.88	25.61	3.747E-03	1550	4.951E-03	.2020	4.771E-03	.1947	6.403E-03
M 6024(300)	26.88	25.61	3.747E-03	1550	4.951E-03	.2020	4.771E-03	.1947	6.403E-03
S 3782(300)	26.88	25.61	3.747E-03	1550	4.951E-03	.2020	4.771E-03	.1947	6.403E-03
T 1041(300)	28.91	27.63	3.657E-03	1492	4.766E-03	.1945	4.592E-03	.1874	5.918E-03
M 6025(300)	28.91	27.63	3.657E-03	1492	4.766E-03	.1945	4.592E-03	.1874	5.918E-03
S 3783(300)	28.91	27.63	3.657E-03	1492	4.766E-03	.1945	4.592E-03	.1874	5.918E-03
T 1051(300)	30.94	29.66	3.530E-03	1439	4.600E-03	.1876	4.432E-03	.1807	5.704E-03
M 6026(300)	30.94	29.66	3.530E-03	1439	4.600E-03	.1876	4.432E-03	.1807	5.704E-03
S 3784(300)	30.94	29.66	3.530E-03	1439	4.600E-03	.1876	4.432E-03	.1807	5.704E-03
T 1061(300)	32.96	31.68	3.415E-03	1393	4.450E-03	.1815	4.288E-03	.1749	5.521E-03
M 6027(300)	32.96	31.68	3.415E-03	1393	4.450E-03	.1815	4.288E-03	.1749	5.521E-03

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7/ 9/73

NASA-RI ARMITER PEATING

AEDC(ARO,INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL R

VAPR9

GROUP	CONFID	MODEL	MACH NO	PO(PSTA)	TO( DEG R)	ALPHA-MODEL	ALPHA-SECTION	ALPHA-PREBEND	ROLL-MODEL	YAW
73	7	ORBITER R4	7.95	212.5	1276	30.02	-0.02	-30.00	-100.00	-0.00
T-INF	P-INF	O-INF	V-INF	RHO-INF	MU-INF	RE/FT	MREF	STREF		
(DEG R)	(PSIA)	(FT/SEC)	(SLUGS/FT <sup>3</sup> )	(LB-SEC/FT <sup>2</sup> )	(FI-1)	(R <sub>0</sub> -.0175FI)	(R <sub>0</sub> -.0175FI)			
93.6	0.23	1.003	1768	2.033E-05	7.534E-08	1.017E 06	2.452E-02	4.034E-02		
CANFEA	ROLL NO	PAINT TEMP (DEG F)	INITIAL TEMP (DEG F)	SQUARE ROOT (R-Q/CACK)	TBAR(ITO)	BETA(ITO)				
TOP(T)	7950									
STRE(S)	8070									
MOTICH(R)	8471									

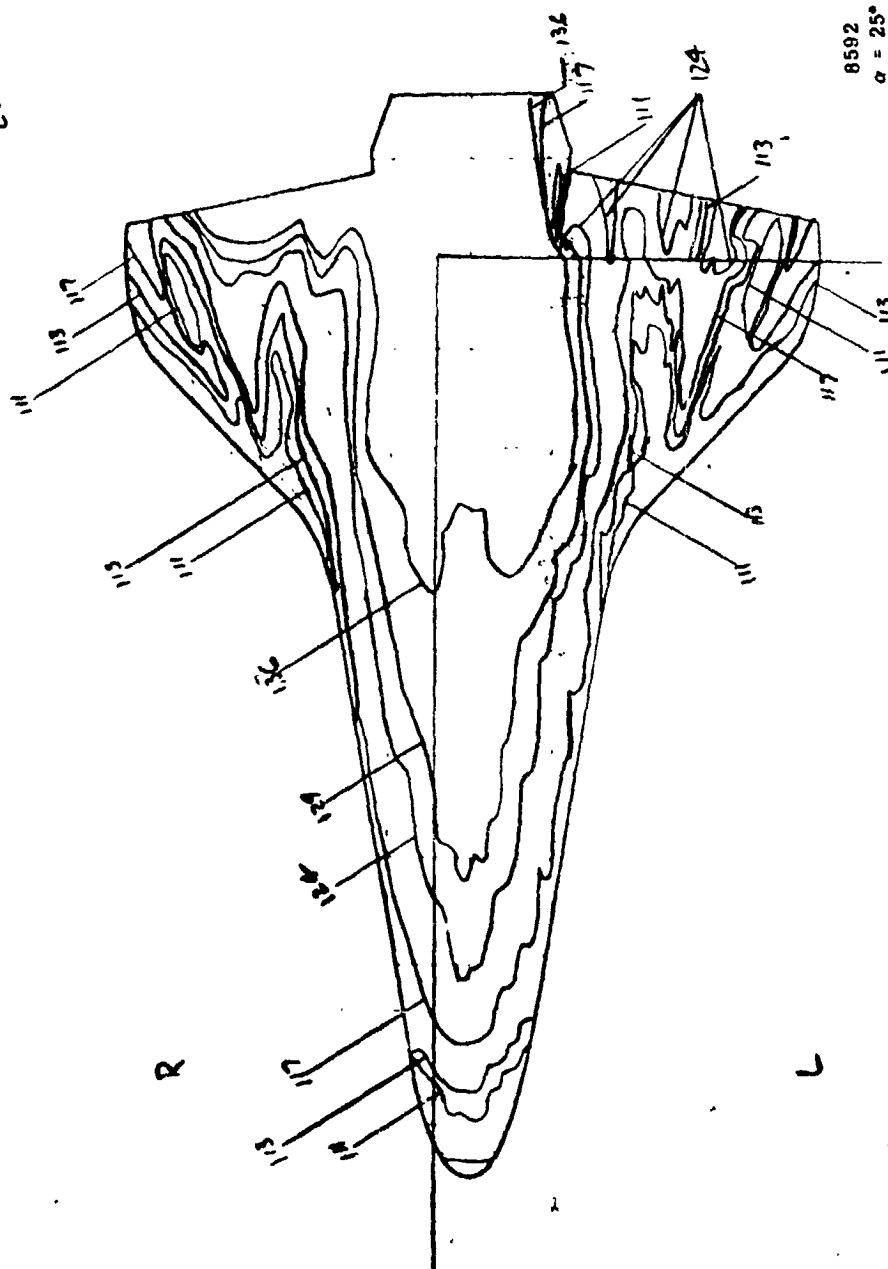
PIC NO	TIME DELTIME	M(ITO)	M(ITO)/MREF	M(-9TO)	M(-5TO)/MREF	M(-912TO)	M(-912TO)/MREF	ST(ITO)
S 3785(700)	32.59	3.414E-03	.1392	4.449E-03	.1014	4.287E-03	.1748	5.516E-03
M 4028(700)	34.26	MODEL HAS LEFT CENTERLINE						
T 107(700)	35.02	3.311E-03	.1344	4.314E-03	.1757	4.157E-03	.1693	5.338E-03
S 3786(700)	35.02	3.310E-03	.1350	4.313E-03	.1759	4.156E-03	.1695	5.350E-03

Y

303

408

7450  
6P 74  
CWC



8592  
 $\alpha = 25^\circ$   
 $\phi = 0^\circ$

Figure 80



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NASA-RI ORBITER PLATING

AEDCI(AROTAC) ARNOLD AFB, TENNESSEE  
VON KARMAN GAS DYNAMICS FACILITY  
50 INCH HYPERSONIC TUNNEL R

VA2R9

GROUP CONFIG MODEL MACH NO P(PSIA) T(DEG R) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREBEND ROLL-MODEL YAW  
74 5 ORBITER R2 7.95 211.3 1277 25.01 4.99 -30.00 -180.00 -0.00

T-INF P-INF O-INF V-INF RNO-INF MU-INF HU/FT MREF STREF  
(DEG R) (PSIA) (FT/SEC) (SLUGS/FT<sup>3</sup>) (LH-SEC/FT<sup>2</sup>) (EI-1) (R<sub>2</sub>-.0175EI) (H<sub>2</sub>-.0175EI)

93.6 .023 .997 3769 2.020E-05 7.53MF-08 1.010E 06 2.445E-02 4.048E-02

CAMERA ROLL NO PAINT IFWP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHOCRAK) TBAR(TO) BETA(TO)

TOP(TI) 7950  
SIDE(S) 8070  
BOTTOM(B) 8471

0.0500

0

0

PTC NO TIME DELTIME H(TO) H(TO)/MREF H(.9TO) H(.9TO)/MREF H(.902TO) H(.902TO)/MREF ST(TO)

T 104(175) 1.15 MODEL HAS NOT REACHED CENTERLINE  
M 6024(175) 1.15 MODEL HAS NOT REACHED CENTERLINE  
S 3782(175) 1.18  
T 109(175) 2.23 MODEL HAS NOT REACHED CENTERLINE  
S 3784(175) 2.23 MODEL HAS NOT REACHED CENTERLINE  
M 6030(175) 2.23 MODEL HAS NOT REACHED CENTERLINE

INJECT TIME = 2.228

T 110(175) 3.28 DATA NOT YET VALID  
M 6031(175) 3.28 DATA NOT YET VALID  
S 3789(175) 3.30 DATA NOT YET VALID

T 111(175) 4.26 3.00 4.675E-03 .1912 4.654E-03 .1904 6.175E-03  
S 3790(175) 4.26 3.00 4.675E-03 .1912 4.654E-03 .1904 6.175E-03  
M 6032(175) 4.26 3.00 4.675E-03 .1912 4.654E-03 .1904 6.175E-03  
T 112(175) 5.41 4.11 4.675E-03 .1912 4.654E-03 .1904 6.175E-03  
M 6033(175) 5.41 4.11 4.675E-03 .1912 4.654E-03 .1904 6.175E-03  
S 3791(175) 5.43 4.11 4.675E-03 .1912 4.654E-03 .1904 6.175E-03  
T 113(175) 6.48 5.20 4.675E-03 .1912 4.654E-03 .1904 6.175E-03  
S 3792(175) 6.48 5.20 4.675E-03 .1912 4.654E-03 .1904 6.175E-03  
M 6034(175) 6.48 5.20 4.675E-03 .1912 4.654E-03 .1904 6.175E-03  
T 114(175) 7.53 6.24 4.675E-03 .1912 4.654E-03 .1904 6.175E-03  
M 6035(175) 7.53 6.24 4.675E-03 .1912 4.654E-03 .1904 6.175E-03  
S 3793(175) 7.56 6.24 4.675E-03 .1912 4.654E-03 .1904 6.175E-03  
T 115(175) 8.61 7.33 4.675E-03 .1912 4.654E-03 .1904 6.175E-03  
M 6036(175) 8.61 7.33 4.675E-03 .1912 4.654E-03 .1904 6.175E-03  
S 3794(175) 8.63 7.34 4.675E-03 .1912 4.654E-03 .1904 6.175E-03  
T 116(175) 9.69 8.41 4.675E-03 .1912 4.654E-03 .1904 6.175E-03  
S 3795(175) 9.69 8.41 4.675E-03 .1912 4.654E-03 .1904 6.175E-03  
M 6037(175) 9.69 8.41 4.675E-03 .1912 4.654E-03 .1904 6.175E-03

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7/ 9/73

NASA-RI ORBITER HEATING AEDCIARD, INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL R

VA289

GROUP CONFIG MODEL MACH NO PO(PSIA) TO( DEG R) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREBEND ROLL-MODEL YAW  
 7A 5 ORBITER R2 7.95 211.2 1277 25.01 4.99 -30.00 -180.00 -.00

T-INF Q-INF V-INF MU-INF RE/FT MREF STREF  
 (DEG R) (PSIA) (PSIA) (FT/SEC) (SLUGS/FT<sup>3</sup>) (LR-SEC/FT<sup>2</sup>) (FT-1) (R=.0175FI) (R=.0175FI)  
 93.6 .997 3769 2.019E-05 7.538E-08 1.010E 06 2.445E-02 4.049E-02

CAMERA ROLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHO/CKK) TRAR(TO) BETA(TO)  
 TOP(T) 7950 175 78 .0509 1.313E-01 1.2992E-01  
 SINF(S) 8070  
 MOTION(R) 8071

PIC NO	TIME DELTIME	M(TO)	H(TO)/MREF	M(.9TO)/MREF	M(.902TO)/MREF	ST(TO)
T 117(175)	10.74	2.150E-03	.0880	2.666E-03	.1091	3.522E-03
S 3796(175)	10.74	2.150E-03	.0880	2.666E-03	.1091	3.522E-03
M 6038(175)	10.74	2.150E-03	.0880	2.666E-03	.1091	3.522E-03
M 6039(175)	11.09	2.040E-03	.0834	2.529E-03	.1035	3.341E-03
T 118(175)	11.01	2.037E-03	.0834	2.526E-03	.1034	3.338E-03
S 3797(175)	11.01	2.037E-03	.0834	2.526E-03	.1034	3.338E-03
T 119(175)	12.86	1.943E-03	.0795	2.409E-03	.0986	3.183E-03
S 3798(175)	12.86	1.943E-03	.0795	2.409E-03	.0986	3.183E-03
M 6040(175)	12.86	1.943E-03	.0795	2.409E-03	.0986	3.183E-03
T 120(175)	13.54	1.858E-03	.0760	2.304E-03	.0943	3.044E-03
S 3799(175)	13.54	1.858E-03	.0760	2.304E-03	.0943	3.044E-03
M 6041(175)	13.54	1.858E-03	.0760	2.304E-03	.0943	3.044E-03
T 121(175)	14.59	1.746E-03	.0730	2.214E-03	.0906	2.925E-03
M 6042(175)	14.59	1.746E-03	.0730	2.214E-03	.0906	2.925E-03
S 3800(175)	15.02	1.744E-03	.0730	2.212E-03	.0905	2.924E-03
T 122(175)	16.07	1.720E-03	.0704	2.132E-03	.0872	2.818E-03
S 3801(175)	16.07	1.720E-03	.0704	2.132E-03	.0872	2.818E-03
M 6043(175)	16.07	1.720E-03	.0704	2.132E-03	.0872	2.818E-03
T 123(175)	17.12	1.661E-03	.0680	2.059E-03	.0843	2.720E-03
M 6044(175)	17.12	1.661E-03	.0680	2.059E-03	.0843	2.720E-03
S 3802(175)	17.14	1.660E-03	.0679	2.059E-03	.0842	2.720E-03
T 124(175)	18.20	1.608E-03	.0658	1.944E-03	.0816	2.636E-03
M 6045(175)	18.20	1.608E-03	.0658	1.944E-03	.0816	2.636E-03
S 3803(175)	18.22	1.607E-03	.0657	1.942E-03	.0815	2.633E-03
T 125(175)	19.27	1.559E-03	.0638	1.933E-03	.0791	2.555E-03
M 6046(175)	19.27	1.559E-03	.0638	1.933E-03	.0791	2.555E-03
S 3804(175)	19.27	1.559E-03	.0638	1.933E-03	.0791	2.555E-03
M 6046(175)	19.27	1.559E-03	.0638	1.933E-03	.0791	2.555E-03

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7/ 9/73

NASA-RJ ORBITER PEATING

AEDC(ARNO, INC.) ARNOLD AFS, TENNESSEE  
VON KARMAN GAS DYNAMICS FACILITY  
50 INCH HYPERSONIC TUNNEL R

VA299

GROUP CONFIG MODEL MACH NO PO(PSIA) TO(DEG R) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREBEND ROLL-MODEL YAW

74 5 ORBITER P2 7.95 211.1 1277 25.01 4.99 -30.00 -180.00 -0.00

T-1AF P-INF O-INF V-INF RHO-INF MU-INF RE/FT MREF STREF

(DEG R) (PSIA) (M-1A) (FT/SEC) (SLUGS/FT3) (LB-SEC/FT3) (FT-LB) (R-0.0175EI) (R-0.0175EI)

93.6 .023 .996 3.70 2.012F-05 7.539F-08 1.009E 06 2.444E-02 4.050E-02

CAMERA ROLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHOXCKK) TRAR(TO) BETAI(TO)

TOP(T) 7450 175 78 .0509 1.313E-01 1.2992E-01

SIG(S) 8070  
NOTIC(MR) R471

PTC NO	TIME DELTIME	H(TO)	H(TO)/HREF	H(.910)	H(.910)/HREF	H(.9020)	H(.9020)/HREF	ST(TO)
M 6047(175)	20.22	1.515E-03	.0620	1.879E-03	.0769	1.870E-03	.0765	2.482E-03
T 126(175)	20.35	1.514E-03	.0620	1.878E-03	.0769	1.869E-03	.0765	2.483E-03
S 3805(175)	20.25	1.514E-03	.0620	1.878E-03	.0769	1.869E-03	.0765	2.483E-03
T 127(175)	20.12	1.474E-03	.0603	1.828E-03	.0748	1.820E-03	.0745	2.416E-03
S 3806(175)	21.40	1.474E-03	.0603	1.828E-03	.0748	1.820E-03	.0745	2.416E-03
M 6048(175)	21.40	1.474E-03	.0603	1.828E-03	.0748	1.820E-03	.0745	2.416E-03
T 128(175)	21.40	1.474E-03	.0603	1.828E-03	.0748	1.820E-03	.0745	2.416E-03
S 3807(175)	21.40	1.474E-03	.0603	1.828E-03	.0748	1.820E-03	.0745	2.416E-03
T 129(175)	22.48	1.436E-03	.0588	1.781E-03	.0729	1.773E-03	.0725	2.354E-03
S 3808(175)	22.48	1.436E-03	.0588	1.781E-03	.0729	1.773E-03	.0725	2.354E-03
M 6049(175)	22.48	1.436E-03	.0588	1.781E-03	.0729	1.773E-03	.0725	2.354E-03
T 130(175)	23.53	1.402E-03	.0573	1.730E-03	.0711	1.720E-03	.0708	2.296E-03
S 3809(175)	23.53	1.402E-03	.0573	1.730E-03	.0711	1.720E-03	.0708	2.296E-03
T 131(175)	23.55	1.401E-03	.0573	1.730E-03	.0711	1.720E-03	.0708	2.296E-03
S 3810(175)	24.60	1.349E-03	.0560	1.698E-03	.0695	1.690E-03	.0692	2.244E-03
M 6050(175)	24.60	1.349E-03	.0560	1.698E-03	.0695	1.690E-03	.0692	2.244E-03
T 132(175)	24.60	1.349E-03	.0560	1.698E-03	.0695	1.690E-03	.0692	2.244E-03
S 3811(175)	25.46	1.339E-03	.0548	1.661E-03	.0680	1.653E-03	.0676	2.195E-03
M 6051(175)	25.46	1.339E-03	.0548	1.661E-03	.0680	1.653E-03	.0676	2.195E-03
T 133(175)	25.68	1.339E-03	.0548	1.661E-03	.0680	1.653E-03	.0676	2.195E-03
S 3812(175)	26.73	1.311E-03	.0536	1.625E-03	.0665	1.618E-03	.0662	2.146E-03
M 6052(175)	26.73	1.311E-03	.0536	1.625E-03	.0665	1.618E-03	.0662	2.146E-03
T 134(175)	26.76	1.310E-03	.0536	1.625E-03	.0665	1.618E-03	.0662	2.146E-03
S 3813(175)	27.48	1.264E-03	.0517	1.567E-03	.0641	1.560E-03	.0638	2.070E-03
M 6053(175)	27.48	1.264E-03	.0517	1.567E-03	.0641	1.560E-03	.0638	2.070E-03
T 135(175)	28.68	1.263E-03	.0517	1.566E-03	.0641	1.559E-03	.0638	2.071E-03
S 3814(175)	29.43	1.219E-03	.0499	1.512E-03	.0618	1.505E-03	.0616	1.998E-03
M 6054(175)	29.43	1.219E-03	.0499	1.512E-03	.0618	1.505E-03	.0616	1.998E-03
T 136(175)	30.71	1.219E-03	.0499	1.512E-03	.0618	1.505E-03	.0616	1.998E-03
S 3815(175)	30.71	1.219E-03	.0499	1.512E-03	.0618	1.505E-03	.0616	1.998E-03
M 6055(175)	30.71	1.219E-03	.0499	1.512E-03	.0618	1.505E-03	.0616	1.998E-03

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7/ 9/73

APDC (ARM, INC.) ARNOLD AFB, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL R

WASA-RI ORBITER HEATING

W2299

GROUP COMPIC MODEL MACH NO PO (PSIA) TO (DEG F) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREBEND ROLL-MODEL YAW

74 9 ORBITER R2 7.99 211.1 1277 25.01 4.99 -30.00 -180.00 -0.00

1-1AF P-1AF Q-1AF RHO-1AF MU-1AF RE-1AF STREF  
 (DEG F) (PSIA) (FT/SEC) (SLUGS/FT<sup>3</sup>) (LB-SEC/FT<sup>2</sup>) (FT-1) (HR-0175E1) (R-0175E1)

93.6 .023 .946 3770 2.918E-05 7.539E-08 1.009E 06 2.444E-02 4.058E-02

CAMERA ROLL NO PAINT IFMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHOXCAK) TRAR (TO) BETAI (TO)

TOP (T) 7450 175 .0509 1.313E-01 1.2992E-01

WOTOM (IR) 8471

PIC NO TIME DELTIME H (TO) H (TO)/HREF H (TO) H (TO)/HREF H (TO) H (TO)/HREF ST (TO)

T 135 (175) 32.74 31.46 1.179E-03 .0483 1.462E-03 .0598 1.455E-03 .0596 1.933E-03

S 3014 (175) 32.74 31.46 1.179E-03 .0483 1.462E-03 .0598 1.455E-03 .0596 1.933E-03

M 6056 (175) 32.74 31.46 1.179E-03 .0483 1.462E-03 .0598 1.455E-03 .0596 1.933E-03

T 136 (175) 34.76 33.49 1.143E-03 .0468 1.417E-03 .0580 1.411E-03 .0577 1.873E-03

M 6057 (175) 34.76 33.49 1.143E-03 .0468 1.417E-03 .0580 1.411E-03 .0577 1.873E-03

S 3015 (175) 34.76 33.49 1.143E-03 .0468 1.417E-03 .0580 1.411E-03 .0577 1.873E-03

M 6058 (175) 35.27 35.51 1.110E-03 .0454 1.376E-03 .0563 1.370E-03 .0560 1.819E-03

T 137 (175) 36.52 35.54 1.109E-03 .0454 1.376E-03 .0563 1.369E-03 .0560 1.818E-03

S 3016 (175) 36.52 35.54 1.109E-03 .0454 1.376E-03 .0563 1.369E-03 .0560 1.818E-03

8070  
G.P. 75  
C.W.

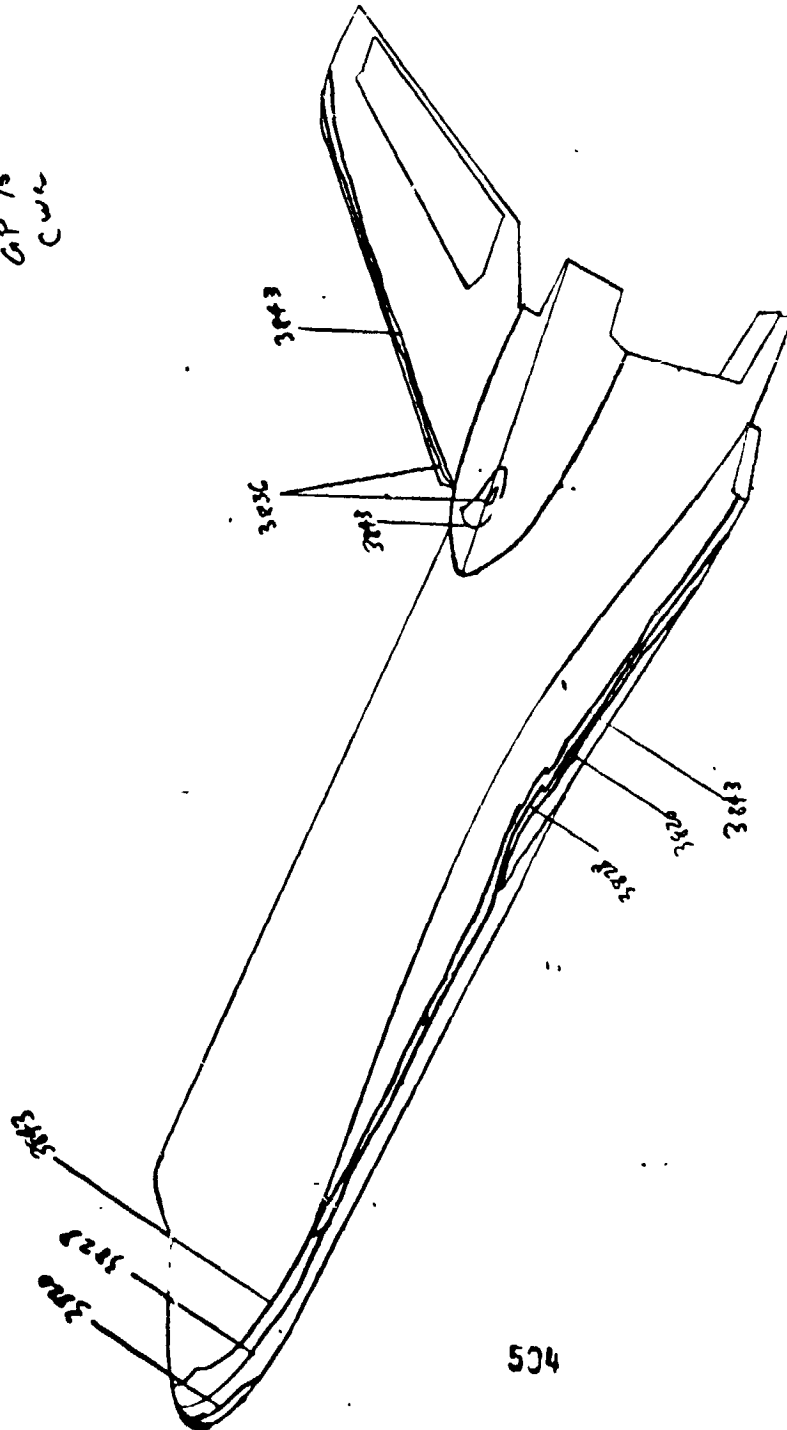
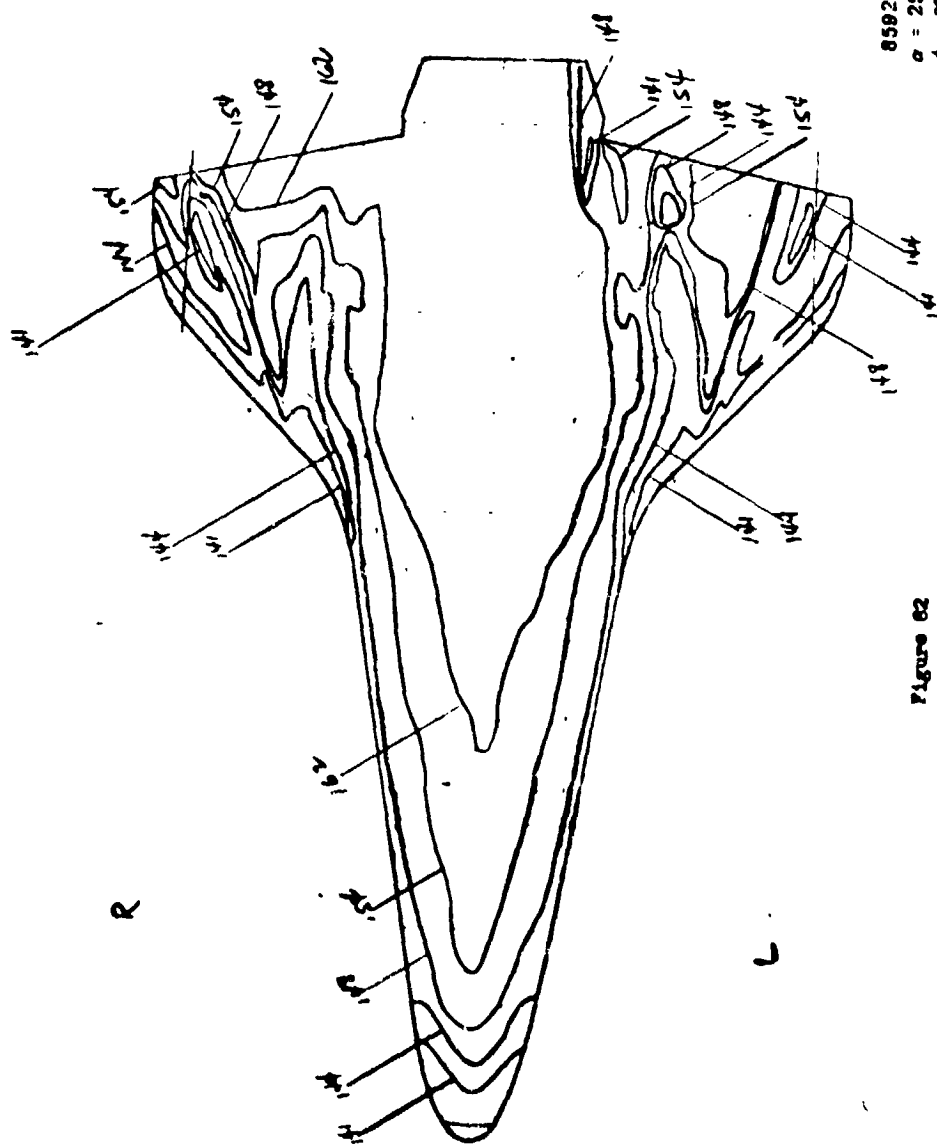


Figure 81

79375  
60 6 2



8592  
 $\alpha = 25^\circ$   
 $\phi = 0^\circ$

Figure 62

MEDCIAR, INC.) ARMO AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL A

WAS-RI GRAYTEA LEAVING

WAZAQ

T-1NF	P-1NF	O-1NF	V-1NF	RMO-1NF	MU-1NF	DE/FT	MRZF	SIRF
(PSIA)	(PSIA)	(PSIA)	(FT/SFC)	(LBS/S/F73)	(RAC/ET2)	(F-1)	(R = .0175E1)	
93.7	.922	.942	377	2.68E-05	7.5E-0P	1.003E 04	2.479E-02	4.061E-02
CONF16	CONF16	MODEL	MACH NO	PO(PSIA)	TO(DEG F)	ALPHA-MODEL	ALPHA-SECTION	ALPHA-PREBEND
2	2	ORBITER \$	7.9E	210.2	1279	25.01	4.99	-30.00
75	75							-180.00
YAW								

ROLL NO	PAINT TEMP (DEG F)	INITIAL TEMP (DEG F)	SIDE ROOT (RHOXCXK)	TRAR(TO)	BETA(TO)
7950	162	80			0
TOP(1)					
8070					
8471					
MOTTCWR					

PIC NO	TIME DELINE	W (TO)	H (TO, /WEE	W (.9 TO)	H (.9 TO /WEE	W (.902 TO)	H (.902 TO)
57(10)	15					438H	438H

[illegible][illegible]

	DATA	NOT	YET	VALID
1	3.00	3.00	3.00	3.00
2	3.00	3.00	3.00	3.00
3	3.00	3.00	3.00	3.00
4	3.00	3.00	3.00	3.00
5	3.00	3.00	3.00	3.00
6	3.00	3.00	3.00	3.00
7	3.00	3.00	3.00	3.00
8	3.00	3.00	3.00	3.00
9	3.00	3.00	3.00	3.00
10	3.00	3.00	3.00	3.00
11	3.00	3.00	3.00	3.00
12	3.00	3.00	3.00	3.00
13	3.00	3.00	3.00	3.00
14	3.00	3.00	3.00	3.00
15	3.00	3.00	3.00	3.00
16	3.00	3.00	3.00	3.00
17	3.00	3.00	3.00	3.00
18	3.00	3.00	3.00	3.00
19	3.00	3.00	3.00	3.00
20	3.00	3.00	3.00	3.00
21	3.00	3.00	3.00	3.00
22	3.00	3.00	3.00	3.00
23	3.00	3.00	3.00	3.00
24	3.00	3.00	3.00	3.00
25	3.00	3.00	3.00	3.00
26	3.00	3.00	3.00	3.00
27	3.00	3.00	3.00	3.00
28	3.00	3.00	3.00	3.00
29	3.00	3.00	3.00	3.00
30	3.00	3.00	3.00	3.00
31	3.00	3.00	3.00	3.00
32	3.00	3.00	3.00	3.00
33	3.00	3.00	3.00	3.00
34	3.00	3.00	3.00	3.00
35	3.00	3.00	3.00	3.00
36	3.00	3.00	3.00	3.00
37	3.00	3.00	3.00	3.00
38	3.00	3.00	3.00	3.00
39	3.00	3.00	3.00	3.00
40	3.00	3.00	3.00	3.00
41	3.00	3.00	3.00	3.00
42	3.00	3.00	3.00	3.00
43	3.00	3.00	3.00	3.00
44	3.00	3.00	3.00	3.00
45	3.00	3.00	3.00	3.00
46	3.00	3.00	3.00	3.00
47	3.00	3.00	3.00	3.00
48	3.00	3.00	3.00	3.00
49	3.00	3.00	3.00	3.00
50	3.00	3.00	3.00	3.00
51	3.00	3.00	3.00	3.00
52	3.00	3.00	3.00	3.00
53	3.00	3.00	3.00	3.00
54	3.00	3.00	3.00	3.00
55	3.00	3.00	3.00	3.00
56	3.00	3.00	3.00	3.00
57	3.00	3.00	3.00	3.00
58	3.00	3.00	3.00	3.00
59	3.00	3.00	3.00	3.00
60	3.00	3.00	3.00	3.00
61	3.00	3.00	3.00	3.00
62	3.00	3.00	3.00	3.00
63	3.00	3.00	3.00	3.00
64	3.00	3.00	3.00	3.00
65	3.00	3.00	3.00	3.00
66	3.00	3.00	3.00	3.00
67	3.00	3.00	3.00	3.00
68	3.00	3.00	3.00	3.00
69	3.00	3.00	3.00	3.00
70	3.00	3.00	3.00	3.00
71	3.00	3.00	3.00	3.00
72	3.00	3.00	3.00	3.00
73	3.00	3.00	3.00	3.00
74	3.00	3.00	3.00	3.00
75	3.00	3.00	3.00	3.00
76	3.00	3.00	3.00	3.00
77	3.00	3.00	3.00	3.00
78	3.00	3.00	3.00	3.00
79	3.00	3.00	3.00	3.00
80	3.00	3.00	3.00	3.00
81	3.00	3.00	3.00	3.00
82	3.00	3.00	3.00	3.00
83	3.00	3.00	3.00	3.00
84	3.00	3.00	3.00	3.00
85	3.00	3.		

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7/ 9/73

NASA-RI ORBITER HEATING

AECI(AR) INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL A

V42R9

GROUP CMFTE MODEL MACH NO PO(PST) T(IDEGR) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREBEND ROLL-MODEL YAW  
 75 2 CREITER S 7.95 210.7 1278 25.01 4.99 -30.00 -185.00 -0.00

T-INF P-INF G-INF V-INF RHO-INF MU-INF RE/FT HREF STREF  
 (DEGR) (PST) (PST) (FT/SEC) (SLUGS/FT<sup>3</sup>) (LBS-SEC/FT<sup>2</sup>) (FT-L) (R= .0175FT) (H= .0175FT)  
 93.7 .022 .995 3771 2.013E-05 7.544E-08 1.006E 06 2.442E-02 4.056E-02

CAMFEA ROLL NO PAINT TEMP (DEGR) INITIAL TEMP (DEGR) SQUARE ROOT (RHO)CAXK) TRAM(TO) BETA(TO)

TOP(T) 7559  
 SIDE(S) 6070  
 BOTTOM(B) 8471

PIC NO	TIME DELT	H(TO)	H(TO)/HREF	M(.970)	M(.970)/HREF	M(.902TO)	M(.902TO)/HREF	ST(TO)
1 146(1169)	9.66	2.066E-03	.0846	2.556E-03	.1046	2.544E-03	.1041	3.392E-03
5 142(1169)	9.66	2.066E-03	.0846	2.556E-03	.1046	2.544E-03	.1041	3.392E-03
1 147(1169)	10.71	1.947E-03	.0797	2.409E-03	.0946	2.394E-03	.0942	3.194E-03
5 142(1169)	10.71	1.947E-03	.0797	2.409E-03	.0946	2.394E-03	.0942	3.194E-03
1 144(1169)	11.76	1.847E-03	.0756	2.285E-03	.0935	2.274E-03	.0931	3.032E-03
5 142(1169)	11.76	1.847E-03	.0756	2.285E-03	.0935	2.274E-03	.0931	3.032E-03
1 149(1169)	12.64	1.745E-03	.0720	2.174E-03	.0891	2.164E-03	.0887	2.884E-03
5 142(1169)	12.64	1.745E-03	.0720	2.174E-03	.0891	2.164E-03	.0887	2.884E-03
1 151(1169)	13.69	1.644E-03	.0689	2.063E-03	.0853	2.074E-03	.0849	2.763E-03
5 142(1169)	13.69	1.644E-03	.0689	2.063E-03	.0853	2.074E-03	.0849	2.763E-03
1 153(1169)	14.54	1.514E-03	.0652	2.002E-03	.0819	1.974E-03	.0815	2.653E-03
5 142(1169)	14.54	1.514E-03	.0652	2.002E-03	.0819	1.974E-03	.0815	2.653E-03
1 152(1169)	16.02	1.544E-03	.0634	1.927E-03	.0789	1.914E-03	.0785	2.557E-03
5 142(1169)	16.02	1.544E-03	.0634	1.927E-03	.0789	1.914E-03	.0785	2.557E-03
1 153(1169)	17.07	1.505E-03	.0614	1.862E-03	.0762	1.853E-03	.0758	2.469E-03
5 142(1169)	17.07	1.505E-03	.0614	1.862E-03	.0762	1.853E-03	.0758	2.469E-03
1 154(1169)	18.15	1.456E-03	.0596	1.802E-03	.0741	1.852E-03	.0734	2.389E-03
5 142(1169)	18.15	1.456E-03	.0596	1.802E-03	.0741	1.852E-03	.0734	2.389E-03
1 154(1169)	18.15	1.456E-03	.0596	1.802E-03	.0741	1.852E-03	.0734	2.389E-03
5 142(1169)	18.15	1.456E-03	.0596	1.802E-03	.0741	1.852E-03	.0734	2.389E-03

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7/ 9/73

# NASA-RI ORBITER HEATING

AEDC(ARNO, INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL R

VA299

GROUP CONFIG MODEL MACH NO POISSA T0 (DEG R) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREPEND ROLL-MODEL YAW  
 75 2 ORBITER S 7.95 211.0 1278 25.01 4.99 -30.00 -180.00 -0.00

T-INF P-INF Q-INF V-INF MU-INF MU-INF RE/FT MREF SREF  
 (DEG R) (PSIA) (PSIA) (FT/SEC) (SLUGS/FT<sup>3</sup>) (LB-SEC/FT<sup>2</sup>) (FT-1) (R= .0175FI) (R= .0175FI)  
 93.7 .023 .996 3771 2.015E-05 7.545E-08 1.007E 06 2.444E-2 4.053E-02

CAMERA ROLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHO/CAK) TRAR(TO) BR TAITO)  
 TOP(T) 7650  
 SIDE(S) R070 100 .0506 1.205E-01 1.819E-01  
 BOTTOM(B) 8471

PIC NO	TIME	DELTIME	H(TO)/MREF	H(910)	H(902TO)/MREF	H(902TO)/MREF	ST(TO)
T 152(169)	19.20	17.92	.0578	1.748E-03	.0715	1.740E-03	2.317E-03
S 152(169)	19.20	17.92	.0578	1.748E-03	.0715	1.740E-03	2.317E-03
M 152(169)	19.20	17.92	.0578	1.748E-03	.0715	1.740E-03	2.317E-03
T 154(169)	20.26	18.97	.0562	1.698E-03	.0695	1.691E-03	2.251E-03
S 154(169)	20.26	18.97	.0562	1.698E-03	.0695	1.691E-03	2.251E-03
M 154(169)	20.26	18.97	.0562	1.698E-03	.0695	1.691E-03	2.251E-03
T 157(169)	21.32	20.06	.0545	1.653E-03	.0676	1.645E-03	2.190E-03
S 157(169)	21.32	20.06	.0545	1.653E-03	.0676	1.645E-03	2.190E-03
M 157(169)	21.32	20.06	.0545	1.653E-03	.0676	1.645E-03	2.190E-03
T 160(169)	22.38	21.10	.0532	1.611E-03	.0659	1.603E-03	2.134E-03
S 160(169)	22.38	21.10	.0532	1.611E-03	.0659	1.603E-03	2.134E-03
M 160(169)	22.38	21.10	.0532	1.611E-03	.0659	1.603E-03	2.134E-03
T 163(169)	23.43	22.37	.0517	1.568E-03	.0640	1.557E-03	2.073E-03
S 163(169)	23.43	22.37	.0517	1.568E-03	.0640	1.557E-03	2.073E-03
M 163(169)	23.43	22.37	.0517	1.568E-03	.0640	1.557E-03	2.073E-03
T 167(169)	24.48	24.40	.0495	1.498E-03	.0612	1.491E-03	1.984E-03
S 167(169)	24.48	24.40	.0495	1.498E-03	.0612	1.491E-03	1.984E-03
M 167(169)	24.48	24.40	.0495	1.498E-03	.0612	1.491E-03	1.984E-03
T 171(169)	25.54	25.46	.0476	1.439E-03	.0589	1.433E-03	1.906E-03
S 171(169)	25.54	25.46	.0476	1.439E-03	.0589	1.433E-03	1.906E-03
M 171(169)	25.54	25.46	.0476	1.439E-03	.0589	1.433E-03	1.906E-03
T 182(169)	26.73	26.66	.0458	1.387E-03	.0567	1.381E-03	1.837E-03
S 182(169)	26.73	26.66	.0458	1.387E-03	.0567	1.381E-03	1.837E-03
M 182(169)	26.73	26.66	.0458	1.387E-03	.0567	1.381E-03	1.837E-03
T 185(169)	31.76	30.68	.0443	1.340E-03	.0548	1.334E-03	1.774E-03
S 185(169)	31.76	30.68	.0443	1.340E-03	.0548	1.334E-03	1.774E-03
M 185(169)	31.76	30.68	.0443	1.340E-03	.0548	1.334E-03	1.774E-03

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AEDC(ARO-INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL A

NASA-RI ORBITER HEATING

VA289

GROUP CONFIG MODEL MACH NO PIPSIA1 TO(DEG R) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREBEND ROLL-MODEL YAW  
 75 2 ORBITER S 7.95 211.4 1279 25.01 4.99 -30.00 -180.00 -.00

T-INF P-INF Q-INF V-INF MU-INF RMU-INF RE/FT MREF STREF  
 (DEG R) (PSIA) (PSIA) (FT/SEC) (SLUGS/FT3) (LB-SEC/FT2) (FT-1) (R= .0175EI) (R= .0175EI)

93.7 .023 .992 3771 2.019E-05 7.546E-04 1.009E 06 2.446E-02 4.050E-02

CAMERA MOLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHOCAR) TRAR(TO) BETA(TO)  
 TOP(T) 7950  
 STOP(T) 8070 169 .0584 1.205E-01 1.1819E-01  
 MOTTOM(9) R471

PIC NO	TIME DELTIME	M(TO)	M(TO)/MREF	M(-910)	M(-910)/MREF	M(-902TO)	M(-902TO)/MREF	ST(TO)
T 1631169)	31.79 36.51	1.003E-03	.0429	1.240E-03	.0548	1.333E-03	.0545	1.774E-03
S 16421169)	31.79 36.51	1.004E-03	.0429	1.340E-03	.0548	1.333E-03	.0545	1.774E-03
T 16431169)	33.01 32.54	1.004E-03	.0429	1.297E-03	.0530	1.291E-03	.0528	1.717E-03
S 16431169)	33.01 32.54	1.004E-03	.0429	1.297E-03	.0530	1.291E-03	.0528	1.717E-03
M 16431169)	33.01 32.54	1.004E-03	.0429	1.297E-03	.0530	1.291E-03	.0528	1.717E-03
MODEL WAS LEFT CENTERLINE								
T 16511169)	35.14 36.54	1.017E-03	.0416	1.259E-03	.0515	1.253E-03	.0512	1.666E-03
S 16441169)	35.04 36.54	1.017E-03	.0416	1.259E-03	.0515	1.253E-03	.0512	1.666E-03
M 16871169)	35.04 36.54	1.017E-03	.0416	1.259E-03	.0515	1.253E-03	.0512	1.666E-03
T 16011169)	37.07 36.59	9.847E-04	.0404	1.223E-03	.0500	1.217E-03	.0498	1.618E-03
M 16041169)	37.07 36.59	9.847E-04	.0404	1.223E-03	.0500	1.217E-03	.0498	1.618E-03
S 16451169)	37.09 36.61	9.847E-04	.0404	1.223E-03	.0500	1.217E-03	.0498	1.618E-03

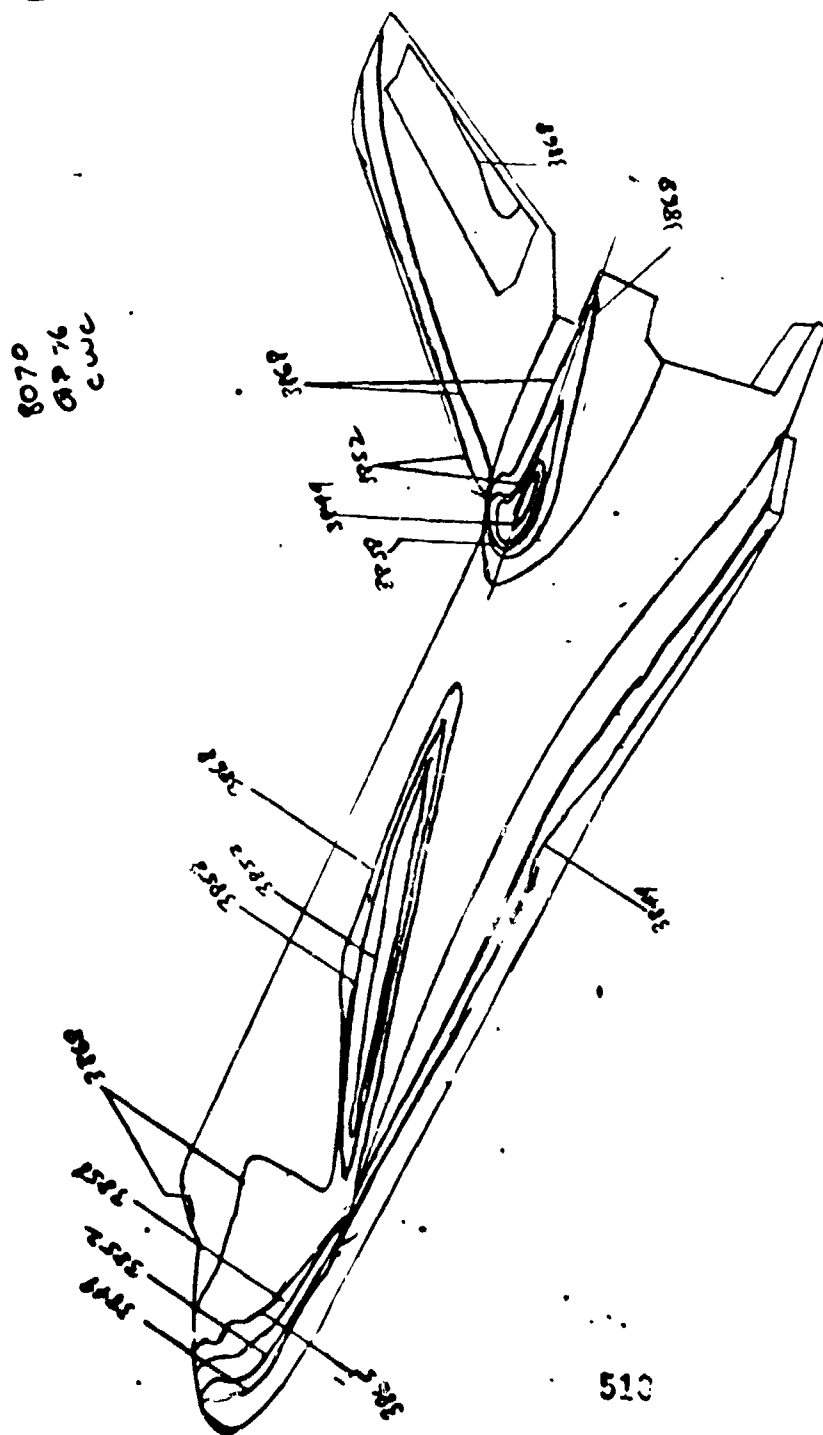
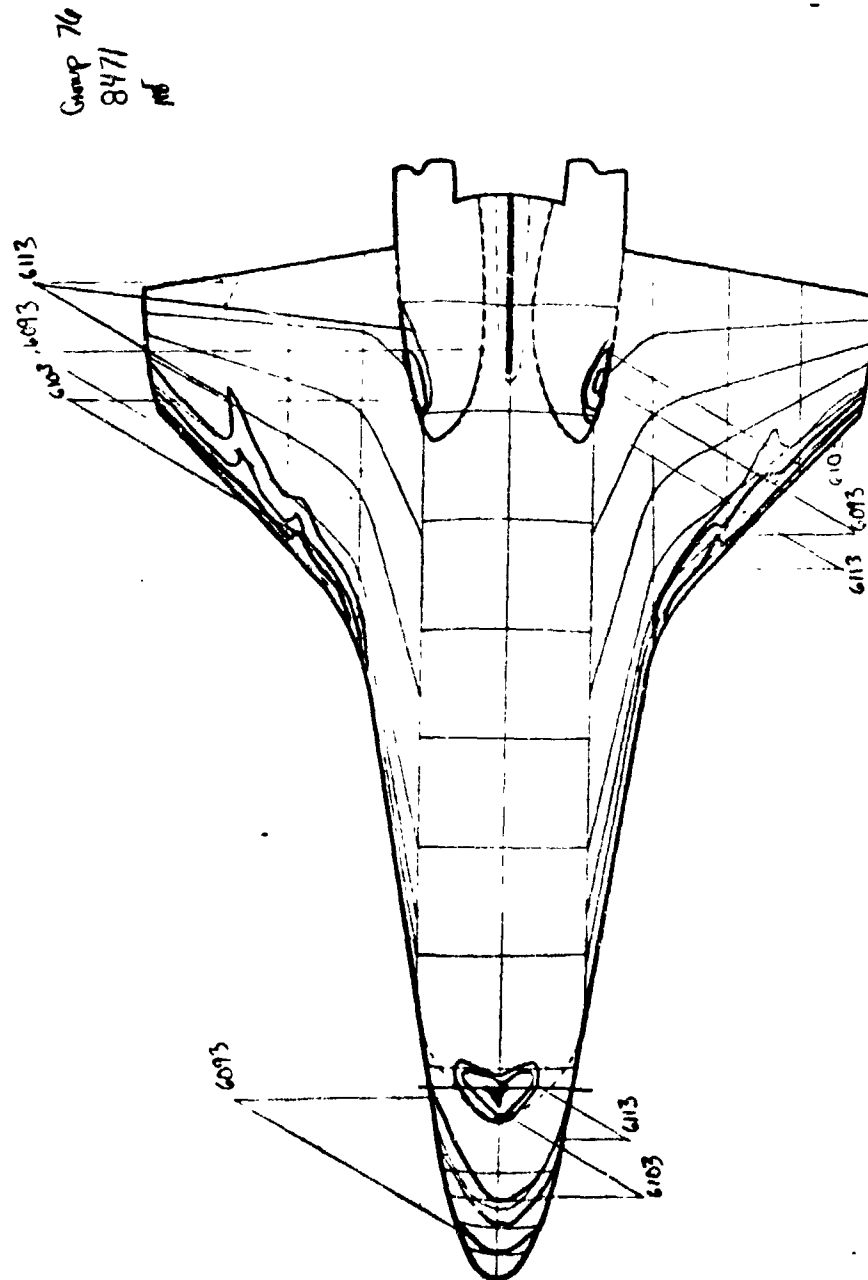


Figure 63



4525  
 $\alpha = 25^\circ$   
 $\phi = 0^\circ$

Figure 84

511.

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WASA-RI ORBITER HEATING  
AEDC(ARO-INC.) ARNOLD AFS, TENNESSEE  
VON KARMAN GAS DYNAMICS FACILITY  
50 INCH HYPERSONIC TUNNEL R

VA289

GROUP CONFIG MODEL MACH NO PO(PSIA) TO(DEG R) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREBEND ROLL-MODEL YAW  
76 2 ORBITER S 7.95 211.6 1279 25.01 4.99 -30.00 -180.00 -0.00  
T-INF P-INF Q-INF V-INF RMO-INF MU-INF HE/FT MREF STREF  
(DEG R) (PSIA) (FT/SEC) (SLUGS/FT<sup>3</sup>) (LB-SEC/FT<sup>2</sup>) (FT-L) (R<sup>2</sup> .0175FT) (R<sup>2</sup> .0175FT)  
93.8 .623 .999 3772 2.023E-05 7.550E-08 1.009E 06 2.448E-02 4.049E-02  
CAMERA ROLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHOCAK) TRAR(TO) BETA(TO)  
TOP(T) 7550  
SIDE(S) 8070  
MOTOM(19) 8471

PIC NO TIM DELTIME H(TO) H'(TO)/HREF H(.910) H(.920)/HREF H(.920TO)/HREF ST(TO)  
T 167(113) 1.18 MODEL HAS NOT REACHED CENTERLINE  
S 3246(113) 1.18 MODEL HAS NOT REACHED CENTERLINE  
M 6083(113) 1.18 MODEL HAS NOT REACHED CENTERLINE  
T 144(113) 2.23 MODEL HAS NOT REACHED CENTERLINE  
S 3247(113) 2.25 MODEL HAS NOT REACHED CENTERLINE  
INJECT TIME = 2.30  
T 169(113) 3.20 DATA NOT YET VALID  
S 3248(113) 3.20 DATA NOT YET VALID  
M 6091(113) 3.20  
T 170(113) 4.38 3.09 1.14E-03 .0452 1.351E-03 .0552 1.345E-03 .0549 1.816E-03  
S 3249(113) 4.38 3.09 1.14E-03 .0452 1.351E-03 .0552 1.345E-03 .0549 1.816E-03  
M 6092(113) 4.38 3.09 1.14E-03 .0452 1.351E-03 .0552 1.345E-03 .0549 1.816E-03  
T 171(113) 5.43 4.14 9.573E-04 .0391 1.167E-03 .0476 1.162E-03 .0474 1.568E-03  
S 3250(113) 5.43 4.14 9.573E-04 .0391 1.167E-03 .0476 1.162E-03 .0474 1.568E-03  
M 6093(113) 5.43 4.14 9.573E-04 .0391 1.167E-03 .0476 1.162E-03 .0474 1.568E-03  
T 172(113) 6.48 5.19 8.548E-04 .0349 1.042E-03 .0425 1.037E-03 .0423 1.401E-03  
S 3251(113) 6.48 5.19 8.548E-04 .0349 1.042E-03 .0425 1.037E-03 .0423 1.401E-03  
M 6094(113) 6.48 5.19 8.548E-04 .0349 1.042E-03 .0425 1.037E-03 .0423 1.401E-03  
T 173(113) 7.56 6.27 7.740E-04 .0318 9.484E-04 .0387 9.441E-04 .0385 1.275E-03  
S 3252(113) 7.56 6.27 7.740E-04 .0318 9.484E-04 .0387 9.441E-04 .0385 1.275E-03  
M 6095(113) 7.56 6.27 7.740E-04 .0318 9.484E-04 .0387 9.441E-04 .0385 1.275E-03  
T 174(113) 8.61 7.32 7.199E-04 .0294 8.777E-04 .0358 8.737E-04 .0357 1.179E-03  
S 3253(113) 8.61 7.32 7.199E-04 .0294 8.777E-04 .0358 8.737E-04 .0357 1.179E-03  
M 6096(113) 8.61 7.32 7.199E-04 .0294 8.777E-04 .0358 8.737E-04 .0357 1.179E-03  
T 175(113) 9.66 8.37 6.732E-04 .0275 8.207E-04 .0335 8.169E-04 .0333 1.102E-03  
S 3254(113) 9.66 8.37 6.732E-04 .0275 8.207E-04 .0335 8.169E-04 .0333 1.102E-03

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**11 9173**

MEDC(ARO,INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL R

50 INCH HYPERSONIC TUNNEL R

[illegible]

ROLL NO	PAINT TEMP (DEG F)	INITIAL TEMP (DEG F)	SQUARE ROOT (RHOXCXK)	TRAR(TO)	BETA(TO)
7550	113	80	0.0475	4.486E-02	4.0998E-02
8070					
8470					
8471					

	PIC NO	TIME	DELTIME	H(T0)	H(T0)/HREF	H(-9T0)	H(-9T0)/HREF	H(-902T0)	H(-902T0)/HREF	ST(T0)
T	175(113)	9.69	8.30	6.72E-04	.0274	8.195E-04	.0335	8.157E-04	.0333	1.101E-03
M	679(113)	9.69	8.39	6.72E-04	.0274	8.195E-04	.0335	8.157E-04	.0333	1.101E-03
T	176(113)	10.74	9.44	6.337E-04	.0259	7.725E-04	.0315	7.690E-04	.0314	1.038E-03
S	755(113)	10.74	9.44	6.337E-04	.0259	7.725E-04	.0315	7.690E-04	.0314	1.038E-03
M	609(113)	10.74	9.44	6.337E-04	.0259	7.725E-04	.0315	7.690E-04	.0314	1.038E-03
M	609(113)	11.79	10.50	6.011E-04	.0245	7.328E-04	.0299	7.293E-04	.0298	.839E-04
T	177(113)	11.81	10.52	6.004E-04	.0245	7.320E-04	.0299	7.286E-04	.0297	9.828E-04
S	385(113)	11.81	10.52	6.004E-04	.0245	7.320E-04	.0299	7.286E-04	.0297	9.828E-04
T	178(113)	12.86	11.57	5.725E-04	.0234	6.979E-04	.0285	6.947E-04	.0283	9.371E-04
S	385(113)	12.86	11.57	5.725E-04	.0234	6.979E-04	.0285	6.947E-04	.0283	9.371E-04
M	610(113)	12.86	11.57	5.725E-04	.0234	6.979E-04	.0285	6.947E-04	.0283	9.371E-04
M	610(113)	13.52	12.62	5.481E-04	.0224	6.672E-04	.0273	6.652E-04	.0271	8.968E-04
T	179(113)	13.54	12.65	5.476E-04	.0223	6.676E-04	.0272	6.645E-04	.0271	8.967E-04
S	385(113)	13.54	12.65	5.476E-04	.0223	6.676E-04	.0272	6.645E-04	.0271	8.967E-04
T	180(113)	14.59	13.70	5.261E-04	.0215	6.414E-04	.0262	6.385E-04	.0260	8.604E-04
S	385(113)	14.59	13.70	5.261E-04	.0215	6.414E-04	.0262	6.385E-04	.0260	8.604E-04
M	6102(113)	14.59	13.70	5.261E-04	.0215	6.414E-04	.0262	6.385E-04	.0260	8.604E-04
M	6103(113)	16.04	14.70	5.071E-04	.0207	6.182E-04	.0252	6.153E-04	.0251	8.296E-04
T	181(113)	16.07	14.74	5.066E-04	.0207	6.176E-04	.0252	6.148E-04	.0251	8.288E-04
S	386(113)	16.07	14.74	5.066E-04	.0207	6.176E-04	.0252	6.148E-04	.0251	8.288E-04
T	182(113)	17.12	15.83	4.835E-04	.0200	5.968E-04	.0243	5.940E-04	.0242	8.008E-04
M	6104(113)	17.12	15.83	4.835E-04	.0200	5.968E-04	.0243	5.940E-04	.0242	8.008E-04
M	6105(113)	18.17	16.48	4.740E-04	.0193	5.779E-04	.0236	5.752E-04	.0235	7.751E-04
T	183(113)	18.20	16.90	4.737E-04	.0193	5.775E-04	.0235	5.748E-04	.0234	7.743E-04
S	386(113)	18.20	16.90	4.737E-04	.0193	5.775E-04	.0235	5.748E-04	.0234	7.743E-04

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AEDC (ARG, INC.) ARHCLD 2FS, TENNESSEE  
VON KARMAN GAS DYNAMICS FACILITY  
50 INCH HYPERSONIC TUNNEL A

WASA-RI ORRIVER FEATIN'G

**VA2A9**

GROUP	CONFIG	MODEL	MACM NO	PO(PSIA)	TO(DEG R)	ALPHA-MODEL	ALPHA-SECTOR	ALPHA-PREBEND	ROLL-MODEL	YAW
74	2	CREITER S	7.95	212.5	1279	25.01	4.99	-30.00	-180.00	-0.00

T-1AF	P-1AF	Q-1AF	V-1AF	PHO-2AF	WU-1AF	RF/FT	MREF	STREF
(066 R)	(051A)	(051A)	(F1/SEC)	(S4UGS/F13)	(LB=SEC/F12)	(F1-1)	(R= .0175F1)	(R= .0175F1)
93.8	.023	1.003	3773	2.028E-05	7.551E-08	1.013E 06	2.445E-02	4.001E-02

CANFRA	HOLL NO	PAINT TEMP (DEG F)	INITIAL TEMP (DEG F)	SQUARE ROOT	TRAR(TO)	BETA(TO)
TOP(T)	7450					
SIDE(S)	8070	113	80	.9475	4.466E-02	4.0998E-02

PIC NO	TIME	DELTIME	MTOT	MTOT/MREF	MT .90101	MT .902101/MREF	MT .902101	MT .902101/MREF	STTOT
T	18411131	19.65	17.95	4.5745-04	.0197	5.5035-04	.0228	5.5775-04	.0227
T	386311131	19.65	17.95	4.5745-04	.0197	5.5035-04	.0228	5.5775-04	.0227
M	412511131	19.65	17.95	4.5745-04	.0197	5.5035-04	.0228	5.5775-04	.0227
M	510711131	20.30	19.01	4.6575-04	.0182	5.4425-04	.0222	5.4215-04	.0221
T	185111131	20.32	19.03	4.6545-04	.0182	5.4425-04	.0222	5.4175-04	.0221
T	386411131	20.32	19.03	4.6545-04	.0182	5.4425-04	.0222	5.4175-04	.0221
T	186111131	21.37	20.08	4.3465-04	.0177	5.2945-04	.0216	5.2745-04	.0215
T	386511131	21.37	20.08	4.3465-04	.0177	5.2945-04	.0216	5.2745-04	.0215
M	412811131	21.37	20.08	4.3465-04	.0177	5.2945-04	.0216	5.2745-04	.0215
T	187111131	22.48	21.19	4.2315-04	.0173	5.1545-04	.0210	5.1355-04	.0209
T	386611131	22.48	21.19	4.2315-04	.0173	5.1545-04	.0210	5.1355-04	.0209
M	510911131	22.48	21.19	4.2315-04	.0173	5.1545-04	.0210	5.1355-04	.0209
T	188111131	24.50	23.21	4.0025-04	.0165	4.9245-04	.0201	4.9055-04	.0200
M	411111131	24.50	23.21	4.0025-04	.0165	4.9245-04	.0201	4.9055-04	.0200
S	386711131	24.52	23.22	4.0045-04	.0165	4.9255-04	.0201	4.9035-04	.0200
M	411111131	24.53	23.24	3.8745-04	.0154	4.7245-04	.0193	4.7025-04	.0192
T	189111131	26.56	25.26	3.8745-04	.0154	4.7245-04	.0193	4.7025-04	.0192
S	386811131	26.56	25.26	3.8745-04	.0154	4.7245-04	.0193	4.7025-04	.0192
T	190111131	28.58	27.29	3.7245-04	.0152	4.5435-04	.0185	4.5245-04	.0184
T	386911131	28.58	27.29	3.7245-04	.0152	4.5435-04	.0185	4.5245-04	.0184
M	411211131	28.58	27.29	3.7245-04	.0152	4.5435-04	.0185	4.5245-04	.0184
T	191111131	30.61	29.32	3.5745-04	.0147	4.3435-04	.0179	4.3655-04	.0178
T	387011131	30.61	29.32	3.5745-04	.0147	4.3435-04	.0179	4.3655-04	.0178
M	511311131	30.61	29.32	3.5745-04	.0147	4.3435-04	.0179	4.3655-04	.0178
T	192111131	32.64	31.34	3.4745-04	.0142	4.2415-04	.0173	4.2215-04	.0172
M	411411131	32.64	31.34	3.4745-04	.0142	4.2415-04	.0173	4.2215-04	.0172

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AEDC(ARO, INC.) ARNOLD AFS, TENNESSEE

## VON KARMAN GAS DYNAMICS FACILITY

## 50 INCH HYPERSONIC TUNNEL R

4.466E-02 4.0998E-02

PIC NO	TYPE	DELTIME	H(TO)	H(TO)/HREF	M(.9TO)	M(.9TO)/HREF	M(.902TO)	M(.902TO)/HREF	ST(10)
S 3A71(113)	32.66	31.37	3.477E-04	.0142	4.239E-04	.0173	4.219E-04	.0172	5.675E-04
	32.29		MODEL HAS LEFT CENTERLINE						
M 4115(113)	34.66	33.37	3.371E-04	.0137	4.110E-04	.0167	4.091E-04	.0167	5.497E-04
T 1931(113)	34.69	33.40	3.370E-04	.0137	4.108E-04	.0167	4.089E-04	.0167	5.500E-04
T 7A72(113)	34.69	33.40	3.370E-04	.0137	4.108E-04	.0167	4.089E-04	.0167	5.500E-04



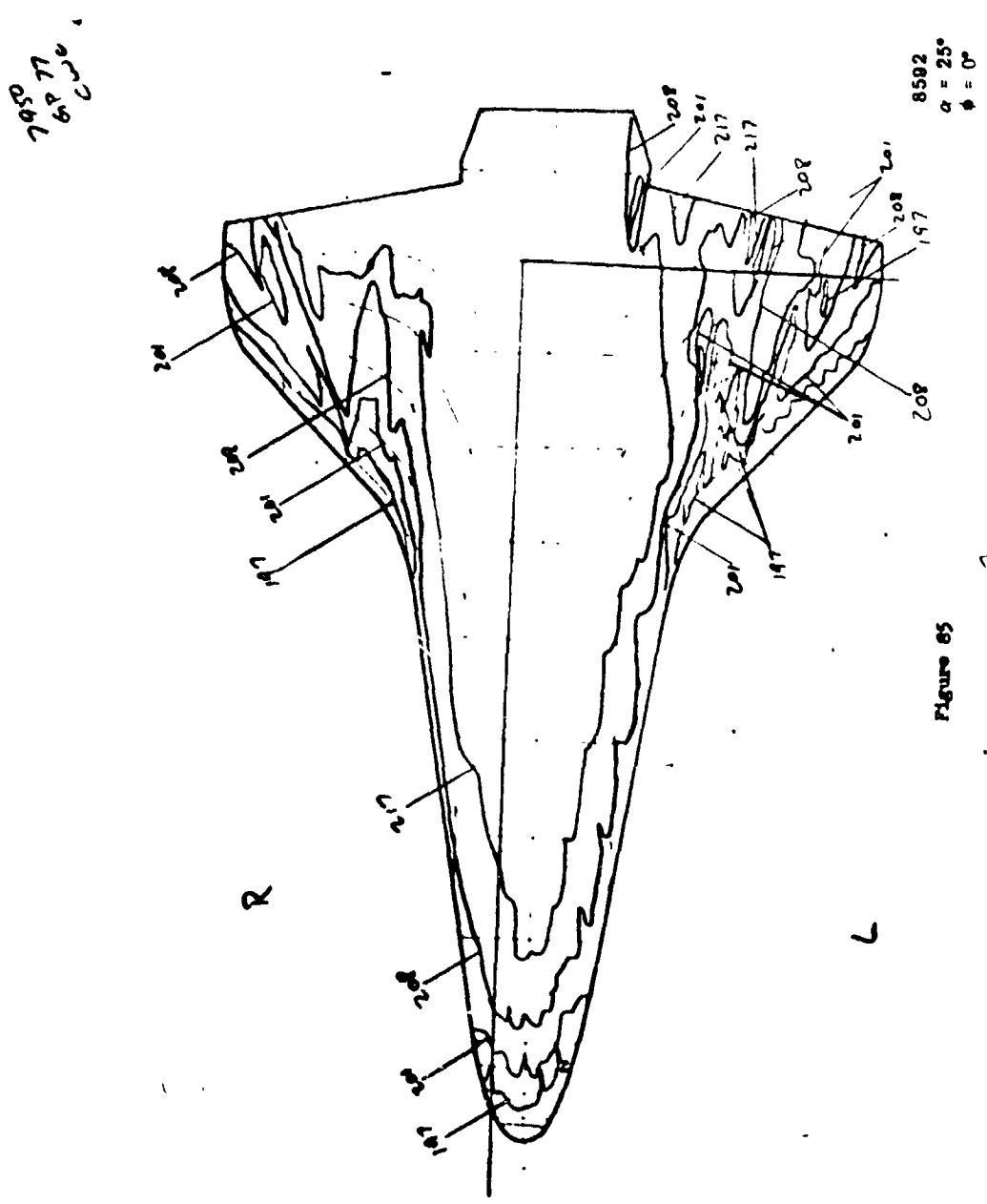


Figure 65

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NASA-R1 ORBITER HEATING

AEDC(ARO, INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL R

VA296

GROUP	CONFID	MODEL	MACH NO	PR(PSTIA)	TO( DEG R)	ALPHA-MODEL	ALPHA-SECTOR	ALPHA-PRESEND	ROLL-MODEL	YAW
77	6	ORBITER R3	7.95	211.6	1220	25.00	5.00	-30.00	-180.00	-0.00
T-INF	P-INF	Q-INF	V-INF	RHO-INF	MU-INF	HF/FT	HREF	STREF		
(DEG R)	(PSIA)	(FT/SEC)	(SLUGS/FT <sup>3</sup> )	(LB-SEC/FT <sup>2</sup> )	(FT-1)	(R=)	(R=)	(R=)		
93.8	-0.23	-0.99	3774	2.019E-05	7.555E-08	1.008E 04	2.448E-02	4.051E-02		
CAMERA	ROLL NO	PAINT TEMP (DEG F)	INITIAL TEMP (DEG F)	SQUARE ROOT (RHUACK)	TRAR(TO)	BETA(TO)				
TOP(IT)	7950									
SIDE(S)	8070									
MOT(MIR)	8471									

PIC NO	TIME DELTIME	H(TO)	H(TO)/HREF	M(.910)	M(.910)/HREF	M(.902TO)	M(.902TO)/HREF	ST(TO)
194(200)	1.18	MODEL HAS NOT REACHED CENTERLINE						
3873(200)	1.18	MODEL HAS NOT REACHED CENTERLINE						
6116(200)	1.18	MODEL HAS NOT REACHED CENTERLINE						
195(200)	2.23	MODEL HAS NOT REACHED CENTERLINE						
3874(200)	2.23	MODEL HAS NOT REACHED CENTERLINE						
INJECT TIME =	2.30							
196(200)	3.30	DATA NOT YET VALID						
3875(200)	3.30	DATA NOT YET VALID						
6118(200)	3.30	DATA NOT YET VALID						
197(200)	4.36	4.92E-03	0.200	6.124E-03	0.248	6.093E-03	0.2486	7.987E-03
3876(200)	4.36	4.84E-03	0.192	6.090E-03	0.248	6.069E-03	0.2476	7.955E-03
198(200)	5.43	4.84E-03	0.192	6.090E-03	0.248	6.069E-03	0.2476	7.955E-03
3877(200)	5.43	4.21E-03	0.1720	5.268E-03	0.2149	5.241E-03	0.2138	6.871E-03
6120(200)	5.43	4.21E-03	0.1720	5.268E-03	0.2149	5.241E-03	0.2138	6.871E-03
199(200)	6.48	3.745E-03	0.1536	4.704E-03	0.1919	4.681E-03	0.1909	6.133E-03
3878(200)	6.48	3.745E-03	0.1536	4.704E-03	0.1919	4.681E-03	0.1909	6.133E-03
200(200)	7.56	3.745E-03	0.1532	4.693E-03	0.1914	4.669E-03	0.1905	6.121E-03
3879(200)	7.56	3.427E-03	0.1398	4.281E-03	0.1747	4.260E-03	0.1738	5.586E-03
6122(200)	7.56	3.427E-03	0.1398	4.281E-03	0.1747	4.260E-03	0.1738	5.586E-03
201(200)	8.4	3.171E-03	0.1293	3.962E-03	0.1616	3.942E-03	0.1608	5.165E-03
3880(200)	8.4	3.171E-03	0.1293	3.962E-03	0.1616	3.942E-03	0.1608	5.165E-03
6123(200)	8.4	3.171E-03	0.1293	3.962E-03	0.1616	3.942E-03	0.1608	5.165E-03
202(200)	9.4	2.965E-03	0.1209	3.704E-03	0.1511	3.686E-03	0.1503	4.830E-03

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NASA-BI ORBITER HEATING JEOC(ARO-INC.) ARNOLD AFB, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL R

VA289

GROUP COMPT6 MODEL MACH NO PO(PSIA) TO(DEC R) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREBEND ROLL-MODEL YAW  
 77 6 ORBITER R3 7.95 212.3 1280 25.00 5.00 -30.00 -180.00 -0.00  
 T-TAR P-INF O-INF W-INF MU-INF RE/FT MREF STREF  
 IDEG RI (PSIA) (FT/SEC) (SLUGS/FT3) (LR-SEC/FT2) (FT-I) (R-0.175FI) (R-0.175FI)  
 93.0 .023 1.002 3774 2.025E-05 7.555E-08 1.012E 04 2.452E-02 4.044E-02  
 CAMERA ROLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHOXCAK) TRAR(TO) BETA(TO)  
 TOP(T) 7450  
 SIDE(S) 8070  
 BOTTOM(B) 8471

PIC NO TIME DELTME H(TO)/HREF H(.9TO)/HREF H(.902TO)/HREF H(.902TO) ST(IT)

1	202(200)	9.69	8.39	2.961E-03	.1208	3.699E-03	.1509	3.680E-03	.1501	4.822E-03
2	300(200)	9.69	8.39	2.961E-03	.1208	3.699E-03	.1509	3.680E-03	.1501	4.822E-03
3	400(200)	10.74	9.44	2.751E-03	.1139	3.487E-03	.1423	3.470E-03	.1415	4.548E-03
4	500(200)	10.74	9.44	2.751E-03	.1139	3.487E-03	.1423	3.470E-03	.1415	4.548E-03
5	600(200)	10.76	9.47	2.744E-03	.1137	3.482E-03	.1420	3.465E-03	.1413	4.540E-03
6	700(200)	11.79	10.50	2.644E-03	.1040	3.308E-03	.1349	3.291E-03	.1342	4.310E-03
7	800(200)	11.61	10.52	2.644E-03	.1040	3.308E-03	.1349	3.291E-03	.1342	4.310E-03
8	900(200)	11.61	10.52	2.644E-03	.1040	3.308E-03	.1349	3.291E-03	.1342	4.310E-03
9	1000(200)	12.45	11.57	2.522E-03	.1028	3.150E-03	.1284	3.134E-03	.1278	4.103E-03
10	1100(200)	12.45	11.57	2.522E-03	.1028	3.150E-03	.1284	3.134E-03	.1278	4.103E-03
11	1200(200)	13.52	12.62	2.414E-03	.0984	3.016E-03	.1230	3.001E-03	.1223	3.929E-03
12	1300(200)	13.52	12.62	2.414E-03	.0984	3.016E-03	.1230	3.001E-03	.1223	3.929E-03
13	1400(200)	14.59	13.74	2.314E-03	.0945	2.895E-03	.1181	2.880E-03	.1175	3.773E-03
14	1500(200)	14.59	13.74	2.314E-03	.0945	2.895E-03	.1181	2.880E-03	.1175	3.773E-03
15	1600(200)	16.04	14.75	2.233E-03	.0911	2.790E-03	.1137	2.776E-03	.1132	3.634E-03
16	1700(200)	16.04	14.75	2.233E-03	.0911	2.790E-03	.1137	2.776E-03	.1132	3.634E-03
17	1800(200)	17.09	15.83	2.156E-03	.0879	2.694E-03	.1098	2.680E-03	.1092	3.507E-03
18	1900(200)	17.09	15.83	2.156E-03	.0879	2.694E-03	.1098	2.680E-03	.1092	3.507E-03
19	2000(200)	18.17	16.90	2.085E-03	.0851	2.608E-03	.1063	2.595E-03	.1058	3.397E-03
20	2100(200)	18.17	16.90	2.085E-03	.0851	2.608E-03	.1063	2.595E-03	.1058	3.397E-03
21	2200(200)	18.17	16.90	2.085E-03	.0851	2.608E-03	.1063	2.595E-03	.1058	3.397E-03
22	2300(200)	18.17	16.90	2.085E-03	.0851	2.608E-03	.1063	2.595E-03	.1058	3.397E-03

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AEOC (ARO, INC.) ARNOLD AFS, TENNESSEE  
VON KARMAN GAS DYNAMICS FACILITY  
50 INCH HYPERSONIC TUNNEL B

IASA-RI ORGIVER HEATING

6629A

GROUP	COMP16	MODEL	MACH NO	PO(PSIA)	TO(DEG R)	ALPHA-MODEL	ALPHA-SECTION	ALPHA-PREBEND	ROLL-MODEL	YAW
77	6	ORETTER R3	7.95	212.5	1280	25.00	5.00	-30.00	-180.00	-0.00

T-TAF	P-TNF	Q-TNF	V-TNF	RNO-TNF	WU-TNF	RE/FT	MREF	STREF
(DEC R)	(PST)	(PST)	(FT/SEC)	(SLUGS/FT)	(LB-SEC/FT)	(FI-1)	(R=	(R=
93.0	.023	1.003	3773	2.020E-05	.553E-04	1.013E 06	2.453E-02	4.047E-02

ROLL NO	PAINT TEMP (DEG F)	INITIAL TEMP (DEG F)	SQUARE ROOT (RHOXCKK)	TRAR(ITO)	BEYA(TO):
7950					
8070	200	90	.0519	1.622E-01	1.6528E-01

PIC NO	TYPE	DELTIME	M(TO)	M(TO)/MREF	M(.9TO)	M(.9TO)/MREF	M(.902TO)	M(.902TO)/MREF	ST(10)
1	211(200)	19.22	2.026E-03	.0026	2.531E-03	.1032	2.510E-03	.1026	3.295E-03
2	213(200)	19.22	2.026E-03	.0026	2.531E-03	.1032	2.510E-03	.1026	3.295E-03
3	309(200)	19.25	2.026E-03	.0026	2.529E-03	.1031	2.515E-03	.1025	3.291E-03
4	212(200)	20.30	1.908E-03	.0002	2.450E-03	.1002	2.446E-03	.0997	3.200E-03
5	301(200)	20.30	1.908E-03	.0002	2.450E-03	.1002	2.446E-03	.0997	3.200E-03
6	313(200)	20.30	1.908E-03	.0002	2.450E-03	.1002	2.446E-03	.0997	3.200E-03
7	219(200)	21.35	1.915E-03	.0002	2.393E-03	.0975	2.381E-03	.0970	3.114E-03
8	313(200)	21.37	1.914E-03	.0002	2.393E-03	.0975	2.379E-03	.0970	3.115E-03
9	302(200)	21.37	1.914E-03	.0002	2.393E-03	.0975	2.379E-03	.0970	3.115E-03
10	316(200)	22.55	1.805E-03	.0002	2.323E-03	.0948	2.313E-03	.0943	3.035E-03
11	214(200)	22.55	1.805E-03	.0002	2.323E-03	.0948	2.313E-03	.0943	3.035E-03
12	303(200)	22.55	1.805E-03	.0002	2.323E-03	.0948	2.313E-03	.0943	3.035E-03
13	215(200)	24.60	1.777E-03	.0024	2.220E-03	.0904	2.204E-03	.0900	2.888E-03
14	304(200)	24.60	1.777E-03	.0024	2.220E-03	.0904	2.204E-03	.0900	2.888E-03
15	216(200)	24.63	1.777E-03	.0024	2.220E-03	.0904	2.204E-03	.0900	2.888E-03
16	316(200)	24.63	1.777E-03	.0024	2.220E-03	.0904	2.204E-03	.0900	2.888E-03
17	305(200)	26.63	1.744E-03	.0095	2.129E-03	.0848	2.114E-03	.0843	2.772E-03
18	218(200)	26.63	1.744E-03	.0095	2.129E-03	.0848	2.114E-03	.0843	2.772E-03
19	318(200)	26.63	1.744E-03	.0095	2.129E-03	.0848	2.114E-03	.0843	2.772E-03
20	219(200)	28.66	1.639E-03	.0064	2.049E-03	.0835	2.034E-03	.0831	2.667E-03
21	319(200)	28.66	1.639E-03	.0064	2.049E-03	.0835	2.034E-03	.0831	2.667E-03
22	306(200)	28.68	1.639E-03	.0064	2.049E-03	.0835	2.034E-03	.0831	2.667E-03
23	218(200)	30.69	1.502E-03	.0023	1.977E-03	.0804	1.967E-03	.0801	2.571E-03
24	318(200)	30.71	1.502E-03	.0023	1.977E-03	.0804	1.967E-03	.0801	2.571E-03
25	307(200)	30.71	1.502E-03	.0023	1.977E-03	.0804	1.967E-03	.0801	2.571E-03
26	219(200)	32.74	1.505E-03	.0023	1.911E-03	.0779	1.902E-03	.0775	2.486E-03
27	308(200)	32.74	1.505E-03	.0023	1.911E-03	.0779	1.902E-03	.0775	2.486E-03
28	319(200)	32.74	1.505E-03	.0023	1.911E-03	.0779	1.902E-03	.0775	2.486E-03

519

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7/ 9/73

AEDC(ARO-INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL R

NASA-RI ORBITER HEATING

VA299

GROUP CONFIG MODEL MACH NO PROPSIA T(0EG R) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREBEND ROLL-MODEL YAW

77 5 ORBITER B3 7.95 212.8 1280 25.00 5.00 -30.00 -180.00 -0.00

T-INF P-INF O-INF V-INF MU-INF RHO-INF RE/FT MREF STREF  
 (DEG R) (PSIA) (PSIA) (FT/SEC) (SLUGS/FT) (LB-SEC/FT2) (FI-1) (R= .0175FI) (R= .0175FI)

93.8 .023 1.004 3773 2.070E-05 7.554E-08 1.014E 06 2.455E-02 4.039E-02

TRAR(TO) BETA(TO)

CAMERA HOLL NO PAINT (FMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHOXCRK) 1.622E-01 1.6528E-01

TOP(T) 7950 200 R0 .0519

%DIFF(S) 8070

MOTICH(B) 8471

PIC NO TIME DELTIME H(TO) H(TO)/MREF H(.9TO) M(.9TO)/MREF H(.902TO) M(.902TO)/MREF ST(TO)

T 220(200) 34.76 33.47 1.483E-03 .0604 1.852E-03 .0755 1.843E-03 .0751 2.410E-03

S 1099(200) 34.76 33.47 1.483E-03 .0604 1.852E-03 .0755 1.843E-03 .0751 2.410E-03

M 6142(200) 34.76 33.47 1.483E-03 .0604 1.852E-03 .0755 1.843E-03 .0751 2.410E-03

MODEL HAS LEFT CENTERLINE

35.17

7950  
6470  
6470

8598  
 $\sigma = 35^\circ$   
 $\phi = 0^\circ$

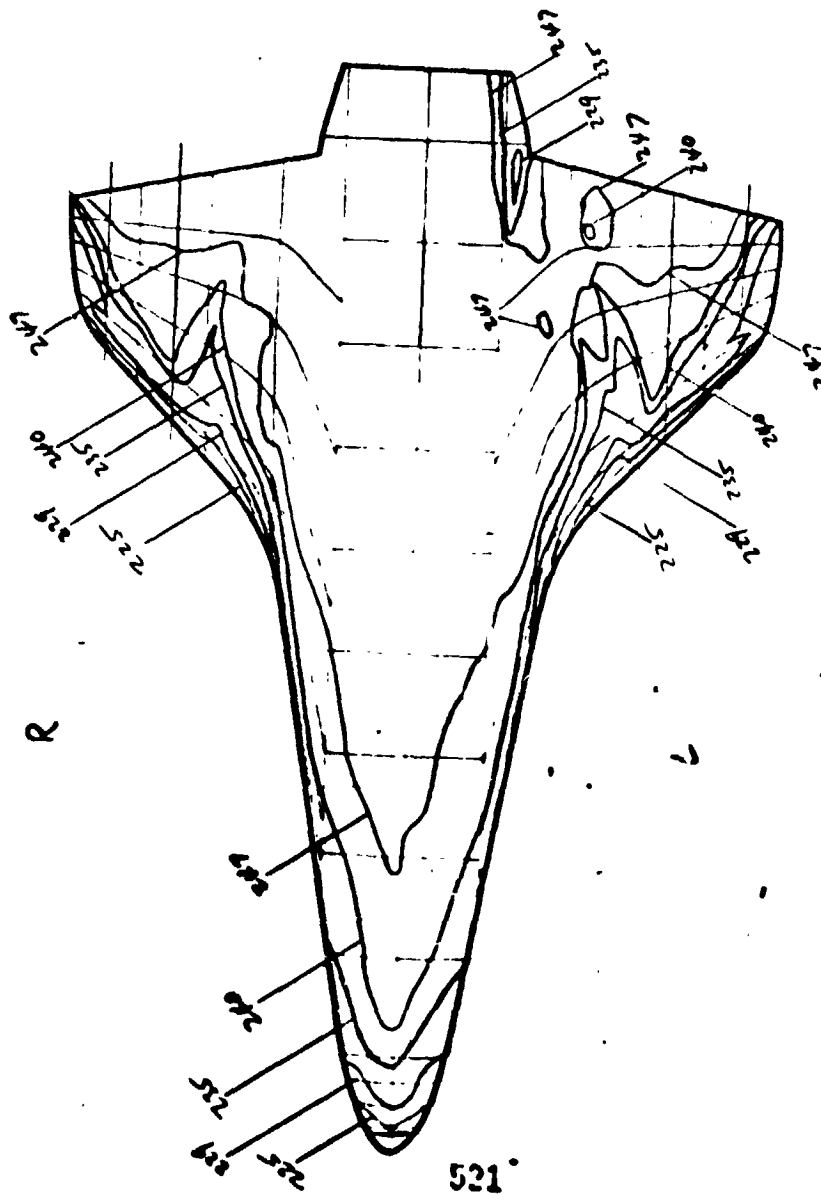


Figure 86

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7/ 9/73

AEDC (ARO-INC.) ANNOLU AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL W

NASA-81 ORBITER HEATING

VA289

GROUP CNF1G MODEL MACH NO PRIPSTA' T0( DEG R) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREBEND ROLL-MODEL YAW  
 7 2 7.95 209.9 1280 35.01 MREF STREF -30.00 -100.00 -0.00

T-INF B-INF U-INF V-INF MU-INF RE/FT MREF STREF  
 (DEG R) (PSIA) (PSIA) (FT/SEC) (SLUGS/FT<sup>3</sup>) (LH-SEC/FT<sup>2</sup>) (F1-1) (R<sub>0</sub> .0175E1) (R<sub>0</sub> .0175E1)  
 93.0 .022 .001 3774 2.002E-05 7.555E-08 1.000E 04 2.478E-02 4.067E-02

CAMERA HOLL MU PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHO/CAK) TRAR(TO) BETA(TO)

TOP(T) 7450  
 SIDE(S) 8070  
 BOTTOM(B) 8471  
 M1 .0535 0 0

MIC NO TIME DELTIME H(TO) M(TO)/MREF H(.9TO) H(.923TO) H(.923TO)/MREF ST(TO)

T 221(250) 1.18 MODEL WAS NOT REACHED CENTERLINE  
 S 1000(250) 1.18 MODEL WAS NOT REACHED CENTERLINE  
 M 5193(250) 1.18 MODEL WAS NOT REACHED CENTERLINE  
 W 6144(250) 2.23 MODEL WAS NOT REACHED CENTERLINE  
 T 222(250) 2.25 MODEL WAS NOT REACHED CENTERLINE  
 S 1001(250) 2.25 MODEL WAS NOT REACHED CENTERLINE

INJECT TIME = 2.30

T 223(250) 3.20 DATA NOT YET VALID

S 3402(250) 3.20 DATA NOT YET VALID

M 4145(250) 3.20 DATA NOT YET VALID

W 224(250) 3.20 DATA NOT YET VALID

T 224(250) 3.20 DATA NOT YET VALID

S 3063(250) 4.38 1.00 7.573E-03 .3105 9.637E-03 .3951 9.062E-03 .3715 1.243E-02

M 4146(250) 4.38 3.09 7.573E-03 .3105 9.637E-03 .3951 9.062E-03 .3715 1.243E-02

W 225(250) 4.38 3.09 7.573E-03 .3105 9.637E-03 .3951 9.062E-03 .3715 1.243E-02

T 225(250) 4.38 4.14 4.541E-03 .2481 8.324E-03 .3412 7.827E-03 .3208 1.073E-02

S 1002(250) 4.38 4.14 4.541E-03 .2481 8.324E-03 .3412 7.827E-03 .3208 1.073E-02

M 4147(250) 5.46 4.14 4.541E-03 .2481 8.324E-03 .3412 7.827E-03 .3208 1.073E-02

W 226(250) 5.46 4.14 4.541E-03 .2481 8.324E-03 .3412 7.827E-03 .3208 1.073E-02

T 226(250) 5.46 5.19 4.541E-03 .2481 8.324E-03 .3412 7.827E-03 .3208 1.073E-02

S 3064(250) 5.46 5.21 4.541E-03 .2481 8.324E-03 .3412 7.827E-03 .3208 1.073E-02

M 4148(250) 6.27 5.21 4.541E-03 .2481 8.324E-03 .3412 7.827E-03 .3208 1.073E-02

W 227(250) 6.27 5.21 4.541E-03 .2481 8.324E-03 .3412 7.827E-03 .3208 1.073E-02

T 227(250) 6.27 6.27 4.541E-03 .2481 8.324E-03 .3412 7.827E-03 .3208 1.073E-02

S 3065(250) 6.27 6.27 4.541E-03 .2481 8.324E-03 .3412 7.827E-03 .3208 1.073E-02

M 4149(250) 7.34 6.27 4.541E-03 .2481 8.324E-03 .3412 7.827E-03 .3208 1.073E-02

W 228(250) 7.34 6.27 4.541E-03 .2481 8.324E-03 .3412 7.827E-03 .3208 1.073E-02

T 228(250) 7.34 7.34 4.541E-03 .2481 8.324E-03 .3412 7.827E-03 .3208 1.073E-02

S 3066(250) 7.34 7.34 4.541E-03 .2481 8.324E-03 .3412 7.827E-03 .3208 1.073E-02

M 4150(250) 8.39 7.34 4.541E-03 .2481 8.324E-03 .3412 7.827E-03 .3208 1.073E-02

W 229(250) 8.39 7.34 4.541E-03 .2481 8.324E-03 .3412 7.827E-03 .3208 1.073E-02

T 229(250) 8.39 8.39 4.541E-03 .2481 8.324E-03 .3412 7.827E-03 .3208 1.073E-02

S 3067(250) 8.39 8.39 4.541E-03 .2481 8.324E-03 .3412 7.827E-03 .3208 1.073E-02

M 4151(250) 9.69 8.39 4.541E-03 .2481 8.324E-03 .3412 7.827E-03 .3208 1.073E-02

W 230(250) 9.69 8.39 4.541E-03 .2481 8.324E-03 .3412 7.827E-03 .3208 1.073E-02

T 230(250) 9.69 8.39 4.541E-03 .2481 8.324E-03 .3412 7.827E-03 .3208 1.073E-02

S 3068(250) 9.69 8.39 4.541E-03 .2481 8.324E-03 .3412 7.827E-03 .3208 1.073E-02

M 4152(250) 9.69 8.39 4.541E-03 .2481 8.324E-03 .3412 7.827E-03 .3208 1.073E-02

W 231(250) 9.69 8.39 4.541E-03 .2481 8.324E-03 .3412 7.827E-03 .3208 1.073E-02

T 231(250) 9.69 8.39 4.541E-03 .2481 8.324E-03 .3412 7.827E-03 .3208 1.073E-02

S 3069(250) 9.69 8.39 4.541E-03 .2481 8.324E-03 .3412 7.827E-03 .3208 1.073E-02

M 4153(250) 9.69 8.39 4.541E-03 .2481 8.324E-03 .3412 7.827E-03 .3208 1.073E-02

W 232(250) 9.69 8.39 4.541E-03 .2481 8.324E-03 .3412 7.827E-03 .3208 1.073E-02

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7/ 9/73

NASA-BI ORBITER HEATING  
AEDICARO, INC. 1 ARNOLD AFS, TENNESSEE  
VON KARMAN GAS DYNAMICS FACILITY  
50 INCH HYPERSONIC TUNNEL A

GROUP COMP16 MODEL MACH NO POI(PSIA) TO(DEG R) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREBEND ROLL-MODEL YAW  
74 2 ORBITER S 7.95 210.1 120 35.01 -5.01 -30.00 -100.00 -0.00

T-IMP P-IMP Q-IMP V-IMP RHO-IMP MU-IMP RE/FT MREF STREF  
IDEG R1 (PSIA) (PSIA) (PSIA) (FT/SEC) (SLUGS/FT3) (LB-SEC/FT2) (FT-LB) (R-0175E1) (R-0175E1)

93.4 .022 .992 3774 2.000E-05 7.555E-08 1.001E 04 2.419E-02 4.065E-02

CAMERA ROLL NO PAINT TEMP (DFG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHO/CAR) TGR(1TO) BETA(1TO)  
TOP(1) 7950  
SIN(1) 8070  
ROT(1B) 8431

PIC NO	TIME DELTME	M(TO)	M(TO)/MREF	M1(9TO)	M1(9TO)/MREF	M1(923TO)	M1(923TO)/MREF	ST(1TO)
4 4152(250)	10.14 9.44	4.330E-03	.1774	5.510E-03	.2250	5.101E-03	.2123	7.100E-03
5 4153(250)	10.16 9.47	4.324E-03	.1772	5.503E-03	.2245	5.174E-03	.2120	7.091E-03
6 4154(250)	10.18 9.47	4.324E-03	.1772	5.503E-03	.2245	5.174E-03	.2120	7.091E-03
7 4155(250)	11.01 10.52	4.102E-03	.1681	5.221E-03	.2139	4.909E-03	.2011	6.724E-03
8 4156(250)	11.01 10.52	4.102E-03	.1681	5.221E-03	.2139	4.909E-03	.2011	6.724E-03
9 4157(250)	11.01 10.52	4.102E-03	.1681	5.221E-03	.2139	4.909E-03	.2011	6.724E-03
10 4158(250)	12.06 11.57	3.911E-03	.1622	4.974E-03	.2039	4.681E-03	.1917	6.408E-03
11 4159(250)	12.06 11.57	3.911E-03	.1622	4.974E-03	.2039	4.681E-03	.1917	6.408E-03
12 4160(250)	12.06 11.57	3.911E-03	.1622	4.974E-03	.2039	4.681E-03	.1917	6.408E-03
13 4161(250)	13.06 12.63	3.741E-03	.1533	4.761E-03	.1951	4.477E-03	.1835	6.135E-03
14 4162(250)	13.06 12.63	3.741E-03	.1533	4.761E-03	.1951	4.477E-03	.1835	6.135E-03
15 4163(250)	13.06 12.63	3.741E-03	.1533	4.761E-03	.1951	4.477E-03	.1835	6.135E-03
16 4164(250)	14.07 13.74	3.545E-03	.1473	4.575E-03	.1874	4.302E-03	.1762	5.893E-03
17 4165(250)	14.07 13.74	3.545E-03	.1473	4.575E-03	.1874	4.302E-03	.1762	5.893E-03
18 4166(250)	15.02 13.72	3.322E-03	.1419	4.371E-03	.1813	4.294E-03	.1761	5.801E-03
19 4167(250)	15.02 13.72	3.322E-03	.1419	4.371E-03	.1813	4.294E-03	.1761	5.801E-03
20 4168(250)	16.07 14.74	3.062E-03	.1370	4.092E-03	.1806	4.144E-03	.1690	5.676E-03
21 4169(250)	16.07 14.74	3.062E-03	.1370	4.092E-03	.1806	4.144E-03	.1690	5.676E-03
22 4170(250)	17.12 15.83	2.855E-03	.1327	3.856E-03	.1806	4.144E-03	.1690	5.676E-03
23 4171(250)	17.12 15.83	2.855E-03	.1327	3.856E-03	.1806	4.144E-03	.1690	5.676E-03
24 4172(250)	17.12 15.83	2.855E-03	.1327	3.856E-03	.1806	4.144E-03	.1690	5.676E-03
25 4173(250)	18.17 16.84	2.639E-03	.1327	3.628E-03	.1806	4.144E-03	.1690	5.676E-03
26 4174(250)	18.17 16.84	2.639E-03	.1327	3.628E-03	.1806	4.144E-03	.1690	5.676E-03
27 4175(250)	19.22 17.93	2.422E-03	.1287	3.399E-03	.1806	4.144E-03	.1690	5.676E-03
28 4176(250)	19.22 17.93	2.422E-03	.1287	3.399E-03	.1806	4.144E-03	.1690	5.676E-03
29 4177(250)	19.22 17.93	2.422E-03	.1287	3.399E-03	.1806	4.144E-03	.1690	5.676E-03
30 4178(250)	19.22 17.93	2.422E-03	.1287	3.399E-03	.1806	4.144E-03	.1690	5.676E-03

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7/ 9/73

# NASA-BI HYPERTEC PEATING

44299

AFDC(ARO-INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL W

WAGUP CMMF16 MODEL MACH NO PO(PSTA) TO(DEG R) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREHENG ROLL-MODEL YAW  
 TA 2 GREITER S 7.95 210.6 1200 35.01 -5.01 -30.00 -100.00 -0.00  
 T-1AF P-1AF O-1AF V-1AF RHO-1AF U-1AF RF/FT MREF STREF  
 (DEG R) (PSIA) (FT/SEC) (SLUGS/FT3) (LBS-SEC/FT2) (FT/SEC) (LBS-SEC/FT2) (R=0.175FT)  
 93.8 -0.22 -0.04 3774 2.000E-05 7.555E-08 1.004E 06 2.442E-02 +0.000E-02  
 CAMERA HOLL NO PAINT IFMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RM CLR) TBAR(10) BETA(10)  
 TOP(1) 7950  
 SIDE(1) 8070  
 MOUTH(1) 8471  
 RI -0535 2.207E-01 2.4071E-01

PTC NO TIME MELTIME M(TOI)/MREF M(-9TO)/MREF M(-923TO)/MREF ST(10)

T 23012501	19.25	17.95	3.140E-03	3.996E-03	1.636	2.758E-03	1.539	5.142E-03
S 39112501	19.25	17.95	7.142E-03	3.996E-03	1.636	3.758E-03	1.539	5.142E-03
T 23012501	20.20	19.01	3.052E-03	3.088E-03	1.590	3.453E-03	1.495	4.996E-03
S 39112501	20.20	19.01	7.052E-03	3.088E-03	1.590	3.653E-03	1.495	4.996E-03
T 24012501	20.20	19.01	3.052E-03	3.088E-03	1.590	3.653E-03	1.495	4.996E-03
S 39112501	20.20	19.01	7.052E-03	3.088E-03	1.590	3.653E-03	1.495	4.996E-03
T 24012501	21.25	20.04	2.971E-03	3.781E-03	1.548	3.556E-03	1.456	4.863E-03
S 39112501	21.25	20.04	7.971E-03	3.781E-03	1.548	3.556E-03	1.456	4.863E-03
T 24012501	21.25	20.04	2.971E-03	3.781E-03	1.548	3.556E-03	1.456	4.863E-03
S 39112501	21.25	20.04	7.971E-03	3.781E-03	1.548	3.556E-03	1.456	4.863E-03
T 24012501	22.42	21.11	2.846E-03	3.466E-03	1.419	3.466E-03	1.419	4.738E-03
S 39112501	22.42	21.11	7.846E-03	3.466E-03	1.419	3.466E-03	1.419	4.738E-03
T 24012501	22.42	21.11	2.846E-03	3.466E-03	1.419	3.466E-03	1.419	4.738E-03
S 39112501	22.42	21.11	7.846E-03	3.466E-03	1.419	3.466E-03	1.419	4.738E-03
T 24012501	24.04	22.74	2.748E-03	3.548E-03	1.452	3.336E-03	1.366	4.562E-03
S 39112501	24.04	22.74	7.748E-03	3.548E-03	1.452	3.336E-03	1.366	4.562E-03
T 24012501	24.04	22.74	2.748E-03	3.548E-03	1.452	3.336E-03	1.366	4.562E-03
S 39112501	24.04	22.74	7.748E-03	3.548E-03	1.452	3.336E-03	1.366	4.562E-03
T 24012501	26.11	24.81	2.671E-03	3.392E-03	1.392	3.197E-03	1.309	4.372E-03
S 39112501	26.11	24.81	7.671E-03	3.392E-03	1.392	3.197E-03	1.309	4.372E-03
T 24012501	26.11	24.81	2.671E-03	3.392E-03	1.392	3.197E-03	1.309	4.372E-03
S 39112501	26.11	24.81	7.671E-03	3.392E-03	1.392	3.197E-03	1.309	4.372E-03
T 24012501	28.13	26.84	2.586E-03	3.248E-03	1.337	3.074E-03	1.258	4.200E-03
S 39112501	28.13	26.84	7.586E-03	3.248E-03	1.337	3.074E-03	1.258	4.200E-03
T 24012501	28.13	26.84	2.586E-03	3.248E-03	1.337	3.074E-03	1.258	4.200E-03
S 39112501	28.13	26.84	7.586E-03	3.248E-03	1.337	3.074E-03	1.258	4.200E-03
T 24012501	30.16	28.87	2.477E-03	3.152E-03	1.290	2.964E-03	1.213	4.049E-03
S 39112501	30.16	28.87	7.477E-03	3.152E-03	1.290	2.964E-03	1.213	4.049E-03
T 24012501	30.16	28.87	2.477E-03	3.152E-03	1.290	2.964E-03	1.213	4.049E-03
S 39112501	30.16	28.87	7.477E-03	3.152E-03	1.290	2.964E-03	1.213	4.049E-03
T 24012501	32.19	30.89	2.344E-03	3.047E-03	1.246	2.865E-03	1.172	3.913E-03
S 39112501	32.19	30.89	7.344E-03	3.047E-03	1.246	2.865E-03	1.172	3.913E-03
T 24012501	32.19	30.89	2.344E-03	3.047E-03	1.246	2.865E-03	1.172	3.913E-03
S 39112501	32.19	30.89	7.344E-03	3.047E-03	1.246	2.865E-03	1.172	3.913E-03

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7/ 9/73

NASA-RI ORBITER HEATING AEDCIARD, INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH MYP GONIC TUNNEL R

VA289

GROUP CONFIG MODEL MACH NO PO(PSIA) TO(DEG R) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREBEND ROLL-MODEL YAW  
 7A 2 ORBITER S 7.95 211.0 1280 35.01 -5.01 -30.00 -180.00 -0.00  
 T-INF P-INF Q-INF V-INF MU-INF RHO-INF RE/FT HREF STREF  
 (DEG R) (PSIA) (PSIA) (FT/SEC) (LB-SEC/FT2) (FT-1) (R= .0175E1) (R= .0175E1)  
 93.8 .023 .996 3774 7.555E-08 1.005E 00 2.444E-02 4.056E-02  
 CAMERA ROLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHOXCK) TRAR(ITO) BETA(ITO)  
 TOP(T) 7950  
 SIDE(S) 8070 250 .0535 2.287E-01 2.4871E-01  
 BOTTOM(B) 8471

PIC NO TIME DELTIME H(ITO) H(TO)/HREF H(-970) H(-910)/HREF H(-723TO) H(-923TO)/HREF ST(ITO)  
 S 3925(250) 32.21 30.92 2.393E-03 .0979 3.045E-03 .1246 2.864E-03 .1171 3.911E-03  
 T 247(250) 34.21 32.92 2.319E-03 .0949 2.951E-03 .1207 2.775E-03 .1135 3.790E-03  
 S 3926(250) 34.21 32.92 2.319E-03 .0949 2.951E-03 .1207 2.775E-03 .1135 3.790E-03  
 M 6169(250) 34.21 32.92 2.319E-03 .0949 2.951E-03 .1207 2.775E-03 .1135 3.790E-03  
 T 244(250) 36.24 34.95 2.251E-03 .0921 2.844E-03 .1172 2.693E-03 .1102 3.680E-03  
 S 3927(250) 36.24 34.95 2.251E-03 .0921 2.844E-03 .1172 2.693E-03 .1102 3.680E-03  
 M 6170(250) 36.24 34.95 2.251E-03 .0921 2.844E-03 .1172 2.693E-03 .1102 3.680E-03  
 MODEL HAS LEFT CENTERLINE  
 T 249(250) 36.27 36.98 2.188E-03 .0895 2.785E-03 .1139 2.619E-03 .1071 3.575E-03  
 S 3928(250) 36.27 36.98 2.188E-03 .0895 2.785E-03 .1139 2.619E-03 .1071 3.575E-03  
 M 6171(250) 36.27 36.98 2.188E-03 .0895 2.785E-03 .1139 2.619E-03 .1071 3.575E-03

8351  
GP 79  
61 600

8595  
 $\alpha = 30^\circ$   
 $\phi = 0^\circ$

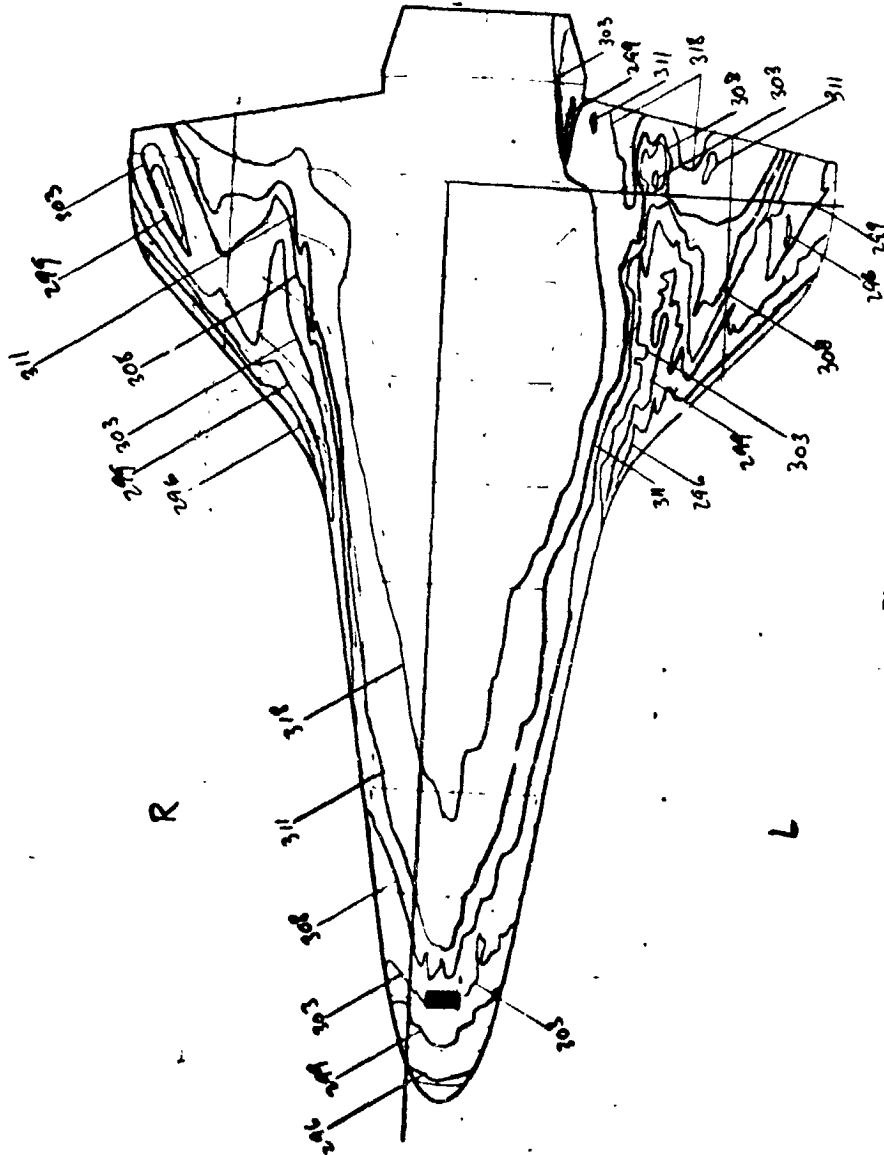


Figure 87

2/10/73

2/10/73

MEODI(ARO,INC.) ARNOLD AFS, TENNESSEE  
VON KARMAN GAS DYNAMICS FACILITY  
50 INCH HYPERSONIC TUNNEL R

WAZAQ

GROUP	CONFIG	MODEL	MACH NO	PO(PSIA)	TO( DEG R)	ALPHA-MODEL	ALPHA-SECTOR	ALPHA-PREBEND	ROLL-MODEL	YAW
79	5	OREITER B3	7.95	205.1	1261	30.00	.00	-30.00	-180.00	-0.00

T-INF (DEG R)	P-INF (PSIA)	Q-INF (PSIA)	V-INF (FT/SEC)	RMO-INF (SLUGS/FT <sup>3</sup> )	MU-INF (LB-SEC/FT <sup>2</sup> )	RE/FT (FT-1)	WREF (R <sub>2</sub> =0.175FT)	STREF (R <sub>2</sub> =0.175FT)
92.5	.022	.968	3746	1.986E-05	7.444E-08	9.992E 05	2.404E-02	4.074E-02

CAMERA	ROLL NO	PAINT TEMP (DEG F)	INITIAL TEMP (DEG F)	SQUARE ROOT (RHOXCKK)	YBAR(10)	BETA(10)
TOP(1)	8251					
SIDE(15)	8063	200	91	.0519		0
BOTTOM(8)	7747					

	PIC NO.	TIME	DELTIME	H(TO)	H(TO)/HREF	H(.9TO)	HREF H(.9TO)	H(.912TO)	HREF H(.912TO)	ST(TO)
T	294(200)	1.10		MODEL HAS NOT REACHED CENTERLINE						
S	3973(200)	1.10		MODEL HAS NOT REACHED CENTERLINE						
M	5216(200)	1.10		MODEL HAS NOT REACHED CENTERLINE						
T	295(200)	2.25		MODEL HAS NOT REACHED CENTERLINE						
S	6217(200)	2.25		MODEL HAS NOT REACHED CENTERLINE						

DATA NOT YET VALID

DATA NOT YET VALID

DATA NOT YET VALID

DATA NOT YET VALID

4.951E-03 .205

4.951E-03 .205

4.931E-03 .205

4.270E-03 .177

6.270F-03 .177

4.257E-03 .177

3.810E-03 .158

3-810E-03 .158

3-801E-03 . . . 158  
3-472E-03 . . . 144

30472E-03  
30472E-03  
30472E-03

3.472E-03 .144

3.21E-73 .133

3.211E-03      •.133

3.21E-03 • 133

3-001E-03 • 124

3,001E-03 .124

3-001E-03 • 124

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	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100	

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7/10/73

AFDC(ARO,INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL #

NASA-R: ORBITER HEATING

VA289

GROUP	CONFIG	MODEL	MACH NO	PO(PSIA)	TO(DEG R)	ALPHA-MODEL	ALPHA-SECTOR	ALPHA-PREBEND	ROLL-MODEL	YAW
79	5	ORBITER RS	7.95	20.9	1262	30.00	.00	-30.00	-180.00	-0.00
T-1NF	P-1NF	Q-1NF	V-1NF	RHO-1NF	MU-1NF	RE/FT	HREF	SIMEF		
(DEG R)	(PSIA)	(FT/SEC)	(SLUGS/FT <sup>3</sup> )	(LB-SEC/FT <sup>2</sup> )	(FT-1)	(R= .0175EI)	(R= .0175EI)	(R= .0175EI)		
92.5	.022	.967	3747	1.982E-05	7.488E-08	9.973E 05	2.403E-02	4.081E-02		
CAMERA	ROLL NO	PAINT TEMP (DEG F)	INITIAL TEMP (DEG F)	SQUARE ROOT (RHO/CXK)	TRAR(TO)	BETAI(TO)				
TOP(T)	8351		81	.0519	1.651E-01	1.6866E-01				
SIDE(S)	8663									
BOTTOM(B)	7767									

PTC NO	TIME DELT	H(TO)	H(TO)/HREF	M(-910)	M(-910)/HREF	M(-912TO)	M(-912TO)/HREF	ST(TO)
S 3982(200)	10.84	2.831E-03	.1179	3.551E-03	.1478	3.442E-03	.1433	4.752E-03
T 303(200)	10.86	2.828E-03	.1177	3.546E-03	.1476	3.438E-03	.1431	4.746E-03
M 6225(200)	10.86	2.828E-03	.1177	3.546E-03	.1476	3.438E-03	.1431	4.746E-03
M 6226(200)	11.81	2.864E-03	.1117	3.366E-03	.1401	3.263E-03	.1358	4.505E-03
T 304(200)	11.84	2.861E-03	.1116	3.362E-03	.1400	3.259E-03	.1357	4.502E-03
S 3983(200)	11.84	2.861E-03	.1116	3.362E-03	.1400	3.259E-03	.1357	4.502E-03
T 305(200)	12.59	2.558E-03	.1065	3.208E-03	.1335	3.110E-03	.1294	4.293E-03
M 6227(200)	12.59	2.558E-03	.1065	3.208E-03	.1335	3.110E-03	.1294	4.293E-03
S 3984(200)	13.01	2.555E-03	.1064	3.204E-03	.1334	3.106E-03	.1293	4.289E-03
M 6228(200)	14.07	2.448E-03	.1019	3.070E-03	.1278	2.976E-03	.1238	4.107E-03
T 306(200)	14.09	2.445E-03	.1018	3.067E-03	.1277	2.973E-03	.1238	4.106E-03
S 3985(200)	14.09	2.445E-03	.1018	3.067E-03	.1277	2.973E-03	.1238	4.106E-03
T 307(200)	15.14	2.351E-03	.0979	2.948E-03	.1227	2.858E-03	.1190	3.946E-03
M 6229(200)	15.14	2.351E-03	.0979	2.948E-03	.1227	2.858E-03	.1190	3.946E-03
S 3986(200)	15.17	2.349E-03	.0977	2.946E-03	.1226	2.856E-03	.1188	3.941E-03
M 6230(200)	16.22	2.245E-03	.0942	2.840E-03	.1182	2.753E-03	.1146	3.797E-03
T 308(200)	16.22	2.245E-03	.0942	2.840E-03	.1182	2.753E-03	.1146	3.797E-03
S 3987(200)	16.24	2.263E-03	.0942	2.838E-03	.1181	2.751E-03	.1145	3.796E-03
T 309(200)	17.24	2.167E-03	.0910	2.743E-03	.1141	2.659E-03	.1106	3.666E-03
S 3988(200)	17.29	2.147E-03	.0910	2.743E-03	.1141	2.659E-03	.1106	3.666E-03
M 6231(200)	17.29	2.147E-03	.0910	2.743E-03	.1141	2.659E-03	.1106	3.666E-03
T 310(200)	18.37	2.117E-03	.0880	2.655E-03	.1104	2.574E-03	.1070	3.547E-03
S 3989(200)	18.37	2.117E-03	.0880	2.655E-03	.1104	2.574E-03	.1070	3.547E-03
M 6232(200)	18.37	2.117E-03	.0880	2.655E-03	.1104	2.574E-03	.1070	3.547E-03
T 311(200)	19.45	2.054E-03	.0853	2.575E-03	.1070	2.497E-03	.1037	3.436E-03
S 3990(200)	19.45	2.054E-03	.0853	2.575E-03	.1070	2.497E-03	.1037	3.436E-03
M 6233(200)	19.45	2.054E-03	.0853	2.575E-03	.1070	2.497E-03	.1037	3.436E-03
T 312(200)	19.45	2.054E-03	.0853	2.575E-03	.1070	2.497E-03	.1037	3.436E-03

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 7/10/73

NASA-RI ORBITER HEATING AEDC(ARO,INC.) ARNOLD AFS, TENNESSEE  
 VAX289 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL R

GROUP C0NF16 MODEL MACH NO PO(PSIA) TO(DEG R) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREBEND ROLL-MODEL YAW  
 79 5 ORBITER R5 7.95 205.5 1263 30.00 .00 -30.00 -180.00 -.00

T-INF P-INF Q-INF V-INF RHO-INF MU-INF RE/FT MREF STREF  
 (DEG R) (PSIA) (PSIA) (FI/SEC) (SLUGS/FI3) (LB-SEC/FI2) (FI-1) (R= .0175FI) (R= .0175FI)  
 92.6 .022 .970 3749 1.947E-05 7.455E-08 9.989E 05 2.407E-02 4.078E-02

CAMERA ROLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHOXCK) TBAR(TO) BETA(TO)  
 TOP(T) 8351  
 SIDE(S) 8063  
 MOTION(R) 7747 200 81 .0519 1.651E-01 1.6866E-01

PIC NO	TIME DELTIME	H(TO)	M(TO)/MREF	H(.9TO)/MREF	H(.912TO)/MREF	H(.912TO)/MREF	ST(TO)		
T	312(200)	20.50	1.997E-03	.0829	2.504E-03	.1040	2.427E-03	.1008	3.336E-03
S	3991(200)	20.52	1.995E-03	.0829	2.502E-03	.1040	2.426E-03	.1008	3.337E-03
M	6234(200)	20.52	1.995E-03	.0829	2.502E-03	.1040	2.426E-03	.1008	3.337E-03
T	313(200)	21.60	1.942E-03	.0804	2.435E-03	.1011	2.301E-03	.0980	3.241E-03
S	3992(200)	21.60	1.942E-03	.0806	2.435E-03	.1011	2.301E-03	.0980	3.241E-03
M	6235(200)	21.60	1.942E-03	.0806	2.435E-03	.1011	2.301E-03	.0980	3.241E-03
T	314(200)	22.65	1.893E-03	.0785	2.375E-03	.0985	2.302E-03	.0955	3.158E-03
S	3993(200)	22.68	1.892E-03	.0785	2.373E-03	.0985	2.301E-03	.0955	3.158E-03
M	6236(200)	22.68	1.892E-03	.0785	2.373E-03	.0985	2.301E-03	.0955	3.158E-03
T	315(200)	24.38	1.821E-03	.0755	2.284E-03	.0947	2.214E-03	.0918	3.035E-03
S	3994(200)	24.40	1.820E-03	.0755	2.283E-03	.0947	2.213E-03	.0918	3.034E-03
M	6237(200)	24.40	1.820E-03	.0755	2.283E-03	.0947	2.213E-03	.0918	3.034E-03
T	316(200)	26.43	1.745E-03	.0723	2.189E-03	.0907	2.122E-03	.0879	2.907E-03
S	3995(200)	26.43	1.745E-03	.0723	2.189E-03	.0907	2.122E-03	.0879	2.907E-03
M	6238(200)	26.43	1.745E-03	.0723	2.189E-03	.0907	2.122E-03	.0879	2.907E-03
T	317(200)	28.46	1.679E-03	.0696	2.108E-03	.0873	2.041E-03	.0846	2.798E-03
S	3996(200)	28.46	1.679E-03	.0696	2.108E-03	.0873	2.041E-03	.0846	2.798E-03
M	6239(200)	28.46	1.679E-03	.0696	2.108E-03	.0873	2.041E-03	.0846	2.798E-03
T	318(200)	30.49	1.620E-03	.0671	2.031E-03	.0842	1.969E-03	.0816	2.699E-03
S	3997(200)	30.51	1.619E-03	.0671	2.030E-03	.0842	1.968E-03	.0816	2.699E-03
M	6240(200)	30.51	1.619E-03	.0671	2.030E-03	.0842	1.968E-03	.0816	2.699E-03
T	319(200)	32.54	1.566E-03	.0649	1.963E-03	.0814	1.903E-03	.0789	2.611E-03
S	3998(200)	32.54	1.566E-03	.0649	1.963E-03	.0814	1.903E-03	.0789	2.611E-03
M	6241(200)	32.54	1.566E-03	.0649	1.963E-03	.0814	1.903E-03	.0789	2.611E-03
T	320(200)	34.56	1.517E-03	.0629	1.903E-03	.0789	1.845E-03	.0765	2.532E-03

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7/10/73

NASA-RI ORBITER PEATING AEDC(ARO, INC.) ARNOLD AFS, TENNESSEE  
JON KARMAN GAS DYNAMICS FACILITY  
50 INCH HYPERSONIC TUNNEL A

VA289

GROUP COMPT6 MODEL MACH NO PO(PSIA) TO(DEG R) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREBEND ROLL-MODEL YAW  
79 5 ORBITER R5 7.95 206.1 1264 36.00 .00 -30.00 -180.00 --.00

T-INF P-INF O-INF V-INF RHO-INF MU-INF RE/FT HREF STREF  
(DEG R) (PSIA) (PSIA) (FT/SEC) (SLUGS/FT3) (LB-SEC/FT2) (FI-1) (R= .0175FI) (R= .0175FI)  
92.7 .022 .973 3750 1.991E-05 7.460E-08 1.001E 06 2.410E-02 4.073E-02

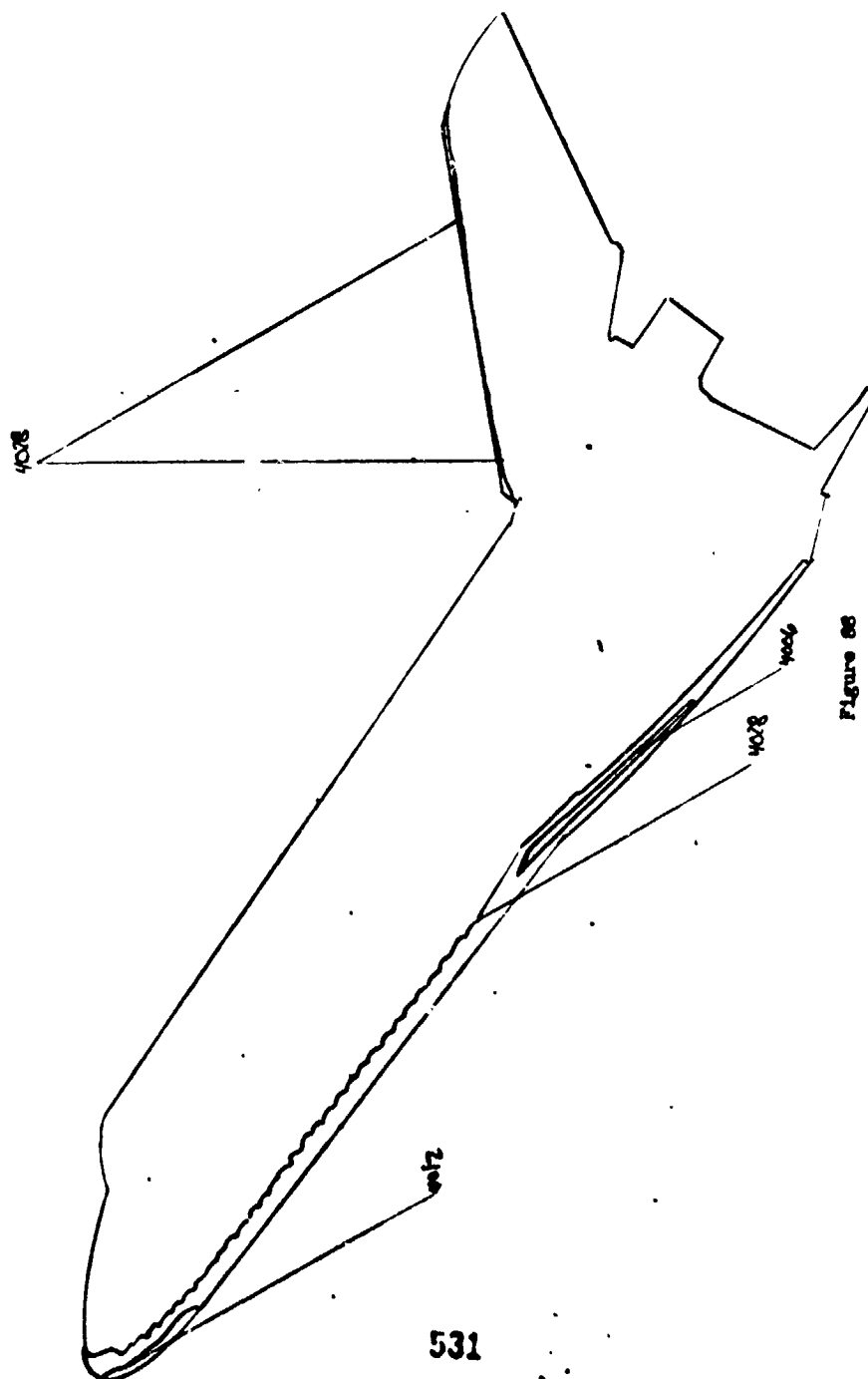
CAMERA ROLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHOXCXK) TRAR(TO) BETA(TO)  
TOP(T) 8251  
SIDE(S) 8063  
MOTICH(B) 7747 200 81 .0519 1.651E-01 1.6866E-01

PIC NO	TIME DELTIME	H(TO)	H(TO)/HREF	H(.9TO)	H(.9TO)/HREF	H(.912TO)	H(.912TO)/HREF	ST(TO)
T 320(200)	34.59 33.31	1.517E-03	.0630	1.902E-03	.0789	1.844E-03	.0755	2.533E-03
S 3999(200)	34.59 33.31	1.517E-03	.0630	1.902E-03	.0789	1.844E-03	.0765	2.533E-03
MODE HAS LEFT CENTERLINE								
T 321(200)	36.62 35.30	1.472E-03	.0612	1.847E-03	.0767	1.790E-03	.0744	2.463E-03
S 4000(200)	36.62 35.34	1.472E-03	.0612	1.847E-03	.0767	1.790E-03	.0744	2.463E-03
M 6243(200)	36.62 35.34	1.472E-03	.0612	1.847E-03	.0767	1.790E-03	.0744	2.463E-03
T 322(200)	38.64 37.37	1.432E-03	.0595	1.796E-03	.0746	1.741E-03	.0723	2.398E-03
S 4001(200)	38.64 37.37	1.432E-03	.0595	1.796E-03	.0746	1.741E-03	.0723	2.398E-03
M 6244(200)	38.64 37.37	1.432E-03	.0595	1.796E-03	.0746	1.741E-03	.0723	2.398E-03
T 323(200)	40.67 39.39	1.395E-03	.0580	1.749E-03	.0727	1.696E-03	.0705	2.335E-03
M 6245(200)	40.67 39.39	1.395E-03	.0580	1.749E-03	.0727	1.696E-03	.0705	2.335E-03
S 4002(200)	40.67 39.42	1.394E-03	.0579	1.748E-03	.0727	1.695E-03	.0704	2.335E-03

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7/10/73

NASA-RI ORBITER HEATING AEDCIARO, INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL R  
 VA209

GROUP COMPT6 MODEL MACH NO PO(PSIA) TO(DEG R) ALFA-MODEL ALPHA-SECTOR ALPHA-PREBEND ROLL-MODEL YAW  
 60 6 ORBITER R3 7.95 210.1 12P4 35.05 -5.05 -30.00 -180.00 -0.00  
 T-INF P-INF Q-INF V-INF RHO-INF MU-INF HE/FT HREF STREF  
 (DEG R) (PSIA) (PSIA) (FT/SFC) (SLUGS/FT3) (LB-SEC/FT2) (FT-1) (R= .0175FT) (R= .0175FT)  
 94.1 .022 .992 .3776 1.998E-05 7.576E-08 9.968E 05 2.440E-02 4.072E-02  
 CAMERA ROLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHO/CXK) TBAR(10) BETA(10)  
 TOP(T) 8351  
 SIDE(S) 8063 250 .0535 0 0  
 BOTTOM(B) 7147

PIC NO TIME DELTIME HITO: HITO/HREF M(.910) M(.910)/HREF M(.92310) M(.92310)/HREF ST(10)

M 6246(250) 1.15 MODEL HAS NOT REACHED CENTERLINE  
 T 324(250) 1.18 MODEL HAS NOT REACHED CENTERLINE  
 S 4003(250) 1.18 MODEL HAS NOT REACHED CENTERLINE  
 T 325(250) 2.23 MODEL HAS NOT REACHED CENTERLINE  
 M 6247(250) 2.23 MODEL HAS NOT REACHED CENTERLINE

INJECT TIME = 2.25

S 4004(250) 2.25 DATA NOT YET VALID

M 6248(250) 3.20 DATA NOT YET VALID

T 324(250) 3.23 DATA NOT YET VALID

S 4005(250) 3.33 DATA NOT YET VALID

T 327(250) 3.32 7.662E-03 .3137 9.739E-03 .3988 9.160E-03 .3750 1.257E-02

M 6249(250) 4.38 3.12 7.662E-03 .3137 9.739E-03 .3988 9.160E-03 .3750 1.257E-02

S 4006(250) 4.41 3.14 7.631E-03 .3123 9.701E-03 .3971 9.124E-03 .3734 1.251E-02

T 328(250) 5.46 4.19 6.605E-03 .2704 8.397E-03 .3437 7.897E-03 .3232 1.083E-02

M 6250(250) 5.46 4.19 6.605E-03 .2704 8.397E-03 .3437 7.897E-03 .3232 1.083E-02

T 4007(250) 5.48 4.22 6.546E-03 .2696 8.372E-03 .3427 7.874E-03 .3224 1.080E-02

S 4008(250) 6.53 5.27 5.892E-03 .2412 7.490E-03 .3066 7.044E-03 .2883 9.661E-03

M 6251(250) 6.53 5.27 5.892E-03 .2412 7.490E-03 .3066 7.044E-03 .2883 9.661E-03

T 330(250) 7.61 6.34 5.369E-03 .2197 6.825E-03 .2793 6.419E-03 .2627 8.799E-03

M 6252(250) 7.61 6.34 5.369E-03 .2197 6.825E-03 .2793 6.419E-03 .2627 8.799E-03

T 331(250) 8.68 7.42 4.944E-03 .2032 6.311E-03 .2583 5.935E-03 .2429 8.140E-03

S 4009(250) 8.68 7.42 4.944E-03 .2032 6.311E-03 .2583 5.935E-03 .2429 8.140E-03

M 6253(250) 9.76 8.50 4.639E-03 .1899 5.898E-03 .2413 5.547E-03 .2270 7.603E-03

T 4010(250) 9.76 8.50 4.639E-03 .1899 5.898E-03 .2413 5.547E-03 .2270 7.603E-03

M 6254(250) 9.76 8.50 4.639E-03 .1899 5.898E-03 .2413 5.547E-03 .2270 7.603E-03

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7/10/73

AEDC(ARO, INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL R

NASA-RT ORBITER HEATING

VA2A9

GROUP CONFIG MODEL MACH NO PO (PSIA) TO (DEG R) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREBEND ROLL-MODEL YAW  
 P 6 6 CREITER R3 7.95 210.7 1284 35.05 -5.05 -30.00 -180.00 -0.00  
 T-INF P-INF Q-INF V-INF MU-INF MU-INF RE/FT STREF  
 (DEG R) (PSIA) (PSIA) (FT/SEC) (SLIN/FT) (LP-SEC/FT) (F1-1) (R= .0175FT) (R= .0175FT)  
 94.1 .022 .004 3779 2.004F-05 7.576E-08 9.997E 05 2.444E-02 4.066E-02

CAMERA ROLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHOXCK) TBAR(TO) BETA(TO)  
 TOP(T) 8351 77 .0535 2.317E-01 2.5277E-01  
 SIDE(S) 8663  
 BOTTOM(B) 7747

PIC NO	TIME DELTIME	H(TO)	M(TO)/HREF	M(.9TO)/HREF	M(.923TO)/HREF	ST(TO)
T 333(250)	10.81	9.55	4.377E-03	.1790	5.563E-03	7.170E-03
S 4017(250)	10.81	9.55	4.377E-03	.1790	5.563E-03	7.170E-03
M 6255(250)	10.84	9.57	4.371E-03	.1788	5.556E-03	7.157E-03
T 334(250)	11.89	10.82	4.143E-03	.1697	5.276E-03	6.793E-03
S 4013(250)	11.91	10.65	4.144E-03	.1696	5.268E-03	6.791E-03
T 335(250)	12.56	11.74	3.944E-03	.1618	4.955E-03	6.791E-03
M 6257(250)	12.56	11.74	3.944E-03	.1618	4.955E-03	6.791E-03
S 4014(250)	12.59	11.73	3.949E-03	.1615	4.952E-03	6.791E-03
T 336(250)	12.64	12.78	3.783E-03	.1568	4.809E-03	6.466E-03
S 4015(250)	14.07	12.84	3.740E-03	.1546	4.805E-03	6.191E-03
T 337(250)	15.12	13.86	3.633E-03	.1486	4.619E-03	6.191E-03
M 6259(250)	15.12	13.85	3.633E-03	.1486	4.619E-03	6.191E-03
T 338(250)	16.19	14.91	3.530E-03	.1431	4.448E-03	5.949E-03
S 4017(250)	16.19	14.93	3.500E-03	.1431	4.448E-03	5.949E-03
T 339(250)	17.27	16.01	3.340E-03	.1382	4.297E-03	5.727E-03
M 6261(250)	17.27	16.01	3.340E-03	.1382	4.297E-03	5.727E-03
T 340(250)	18.25	17.08	3.272E-03	.1338	4.159E-03	5.532E-03
S 4019(250)	18.25	17.08	3.272E-03	.1338	4.159E-03	5.532E-03
T 341(250)	19.42	18.16	3.174E-03	.1298	4.034E-03	5.357E-03
M 6263(250)	19.42	18.16	3.174E-03	.1298	4.034E-03	5.357E-03

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7/16/73

WASA-RT ORBITER HEATING  
 AEDC(ARO, INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL B

VA280

GROUP CONFIG MODEL MACH NO PRIP(SIA) TO(DEG R) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREBEND ROLL-MODEL YAW  
 80 6 ORBITER #3 7.95 211.0 1284 35.05 -5.05 -30.00 -100.00 -0.00

T-TAF P-TAF Q-TAF V-INF RMO-INF MU-INF MREF RF/FT STREF  
 (DEG R) (PSIA) (PSIA) (FT/SEC) (SLUGS/FT3) (LB-SEC/FT2) (FT-1) (R= .0175FT) (R= .0175FT)  
 94.1 .023 .996 3770 2.007E-05 7.576E-08 1.001E 06 2.445E-02 5.004E-02

CAMERA ROLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHOXCAK) TBAR(10) BETA(10)  
 TOP(1) 8351  
 SIDE(S) 8063  
 BOTTOM(B) 7747

0535

PIC NO	TYPE	DELTIME	H(10)	H(10)/MREF	H(.970)	M(.970)/MREF	M(.923T0)	H(.923T0)/MREF	ST(10)
T 342(250)	20.50	19.23	3.044E-03	.1261	3.920E-03	.1403	3.687E-03	.1508	5.046E-03
S 402(250)	20.50	19.23	3.044E-03	.1261	3.920E-03	.1403	3.687E-03	.1508	5.046E-03
M 626(250)	20.50	19.23	3.044E-03	.1261	3.920E-03	.1403	3.687E-03	.1508	5.046E-03
T 343(250)	21.57	20.31	3.001E-03	.1227	3.817E-03	.1350	3.589E-03	.1467	4.908E-03
S 402(250)	21.57	20.31	3.001E-03	.1227	3.817E-03	.1350	3.589E-03	.1467	4.908E-03
M 626(250)	21.57	20.31	3.001E-03	.1227	3.817E-03	.1350	3.589E-03	.1467	4.908E-03
T 344(250)	23.08	21.81	2.896E-03	.1184	3.681E-03	.1305	3.462E-03	.1415	4.736E-03
M 626(250)	23.08	21.81	2.896E-03	.1184	3.681E-03	.1305	3.462E-03	.1415	4.736E-03
S 402(250)	23.10	21.84	2.894E-03	.1183	3.679E-03	.1304	3.460E-03	.1414	4.732E-03
T 345(250)	25.13	23.84	2.768E-03	.1131	3.519E-03	.1238	3.310E-03	.1353	4.526E-03
M 626(250)	25.13	23.84	2.768E-03	.1131	3.519E-03	.1238	3.310E-03	.1353	4.526E-03
T 346(250)	25.15	23.89	2.747E-03	.1131	3.517E-03	.1238	3.308E-03	.1352	4.524E-03
M 626(250)	25.16	23.89	2.659E-03	.1086	3.378E-03	.1190	3.177E-03	.1298	4.341E-03
T 346(250)	27.18	25.92	2.656E-03	.1086	3.377E-03	.1190	3.176E-03	.1298	4.340E-03
S 402(250)	27.18	25.92	2.656E-03	.1086	3.377E-03	.1190	3.176E-03	.1298	4.340E-03
T 347(250)	29.21	27.94	2.558E-03	.1046	3.252E-03	.1139	3.059E-03	.1250	4.182E-03
S 402(250)	29.21	27.94	2.558E-03	.1046	3.252E-03	.1139	3.059E-03	.1250	4.182E-03
M 626(250)	29.21	27.94	2.558E-03	.1046	3.252E-03	.1139	3.059E-03	.1250	4.182E-03
T 348(250)	31.24	29.97	2.470E-03	.1009	3.140E-03	.1093	2.953E-03	.1207	4.037E-03
S 402(250)	31.24	29.97	2.470E-03	.1009	3.140E-03	.1093	2.953E-03	.1207	4.037E-03
M 627(250)	31.24	29.97	2.470E-03	.1009	3.140E-03	.1093	2.953E-03	.1207	4.037E-03
T 349(250)	33.26	32.00	2.341E-03	.0977	3.039E-03	.1042	2.859E-03	.1168	3.907E-03
M 627(250)	33.26	32.00	2.341E-03	.0977	3.039E-03	.1042	2.859E-03	.1168	3.907E-03
S 402(250)	33.29	32.02	2.340E-03	.0976	3.038E-03	.1041	2.857E-03	.1167	3.903E-03
T 350(250)	35.29	34.03	2.318E-03	.0947	2.947E-03	.1004	2.772E-03	.1132	3.787E-03
M 627(250)	35.29	34.03	2.318E-03	.0947	2.947E-03	.1004	2.772E-03	.1132	3.787E-03

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7/10/73

NASA-RI ORBITER HEATING AEDC(ARO,INC.) ARNOLD AFS, TENNESSEE  
VON KARMAN GAS DYNAMICS FACILITY  
VA209 50 INCH HYPERSONIC TUNNEL M

GROUP CNAME MODEL MACH NO PO(PSIA) TO(DEG R) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREBEND ROLL-MODEL YAW  
20 6 ORBITER R3 7.95 211.4 1283 35.05 -5.05 -30.00 -100.00 -0.00

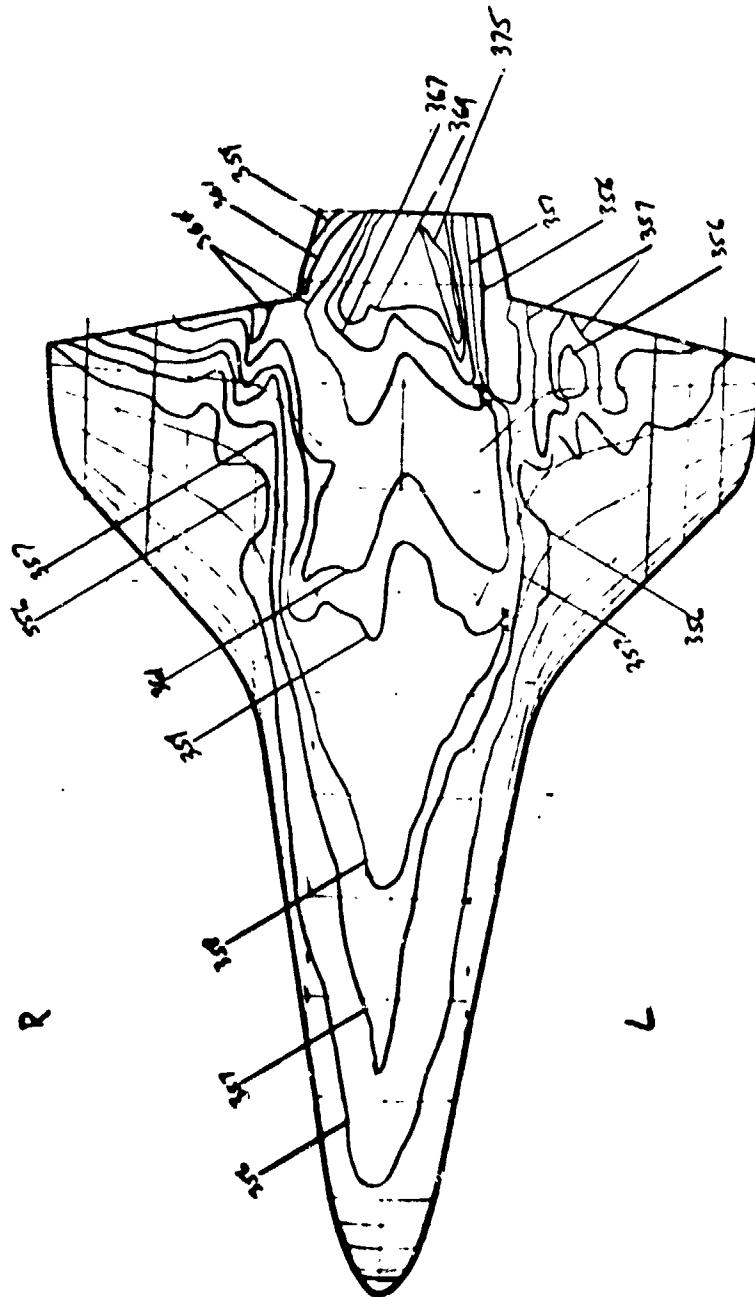
T-IMP P-IMP Q-IMP V-IMP MU-IMP MU-IMP RE/FT MREF STREF  
(DEG R) (PSIA) (PSIA) (FT/SEC) (SLUGS/FT3) (LBS-SEC/FT2) (FT-1) (R= .0175FT) (R= .0175FT)  
V4.1 .023 .998 .3779 7.575E-08 1.003E 06 2.448E-02 6.056E-02

CAMPA ROLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHOACR) TBAR(10) BETAIT(0)  
TOP(1) 8351  
SIDE(1) 8063  
BOTTOM(8) 7767

77 .0535 2.317E-01 2.527E-01

PTC NO	TIME DELT(SEC)	H(10)	H(10)/HREF	H(10)	H(10)/HREF	H(10)	H(10)/HREF	ST(10)
S 4020(250)	35.32	36.05	.0947	2.946E-03	.1204	2.771E-03	.1132	3.787E-03
T 451(250)	36.49	36.00	.0920	2.862E-03	.1173	2.692E-03	.1100	3.679E-03
S 4030(250)	37.34	36.00	.0920	2.862E-03	.1170	2.692E-03	.1100	3.679E-03
M 6273(250)	37.34	36.00	.0920	2.862E-03	.1170	2.692E-03	.1100	3.679E-03
M 6274(250)	39.37	36.11	.0895	2.785E-03	.1137	2.619E-03	.1070	3.577E-03
T 352(250)	39.40	36.11	.0895	2.784E-03	.1137	2.618E-03	.1070	3.577E-03
S 4031(250)	39.40	36.13	.0872	2.713E-03	.1108	2.551E-03	.1042	3.485E-03
T 353(250)	41.42	40.16	.0872	2.713E-03	.1108	2.551E-03	.1042	3.485E-03
S 4032(250)	41.42	40.16	.0872	2.713E-03	.1108	2.551E-03	.1042	3.485E-03
M 6275(250)	41.42	40.16	.0872	2.713E-03	.1108	2.551E-03	.1042	3.485E-03

9351  
6P81  
Cue



8598  
 $\alpha = 35^\circ$   
 $\phi = 0^\circ$

Figure 91

537

Gap 81  
8563  
no

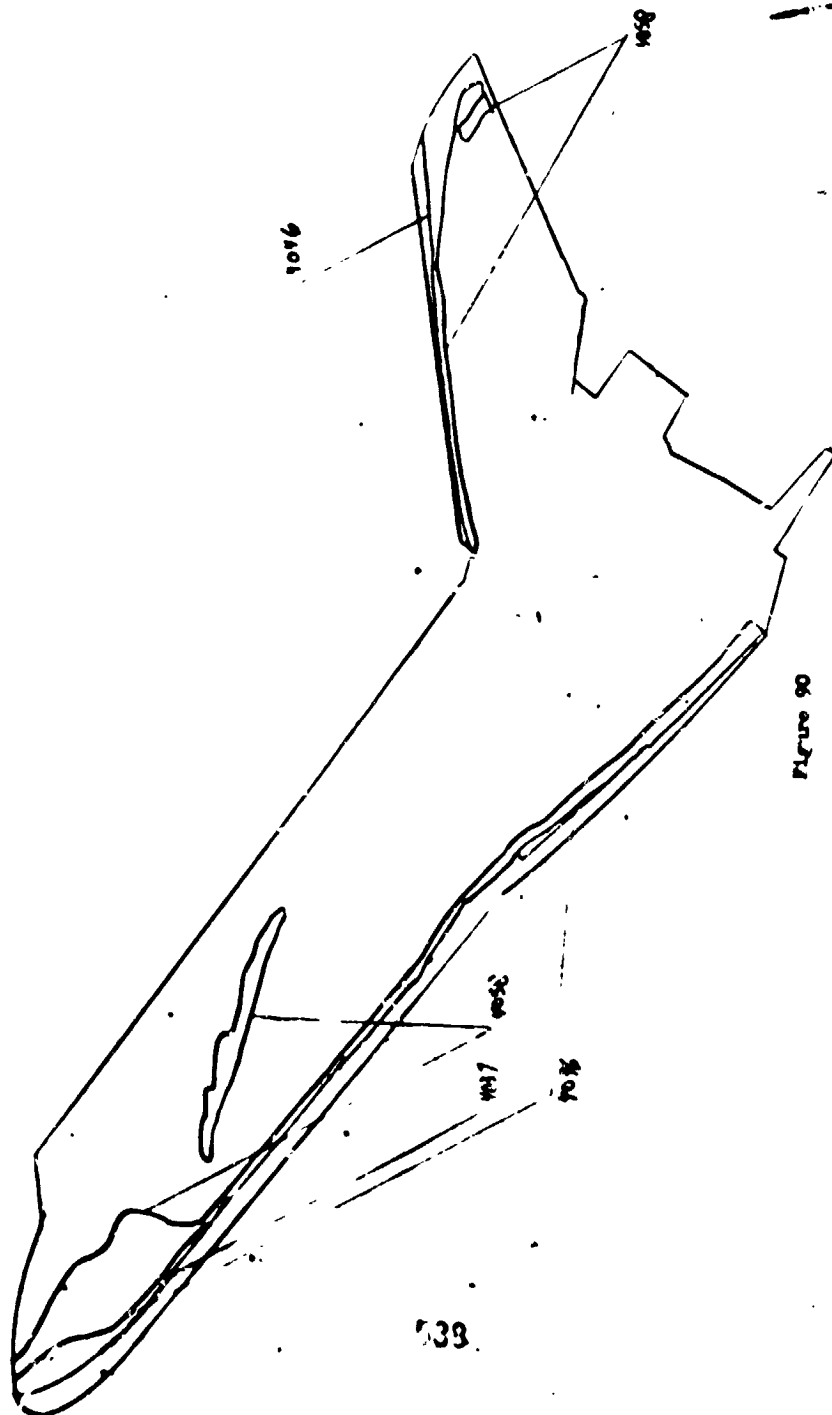
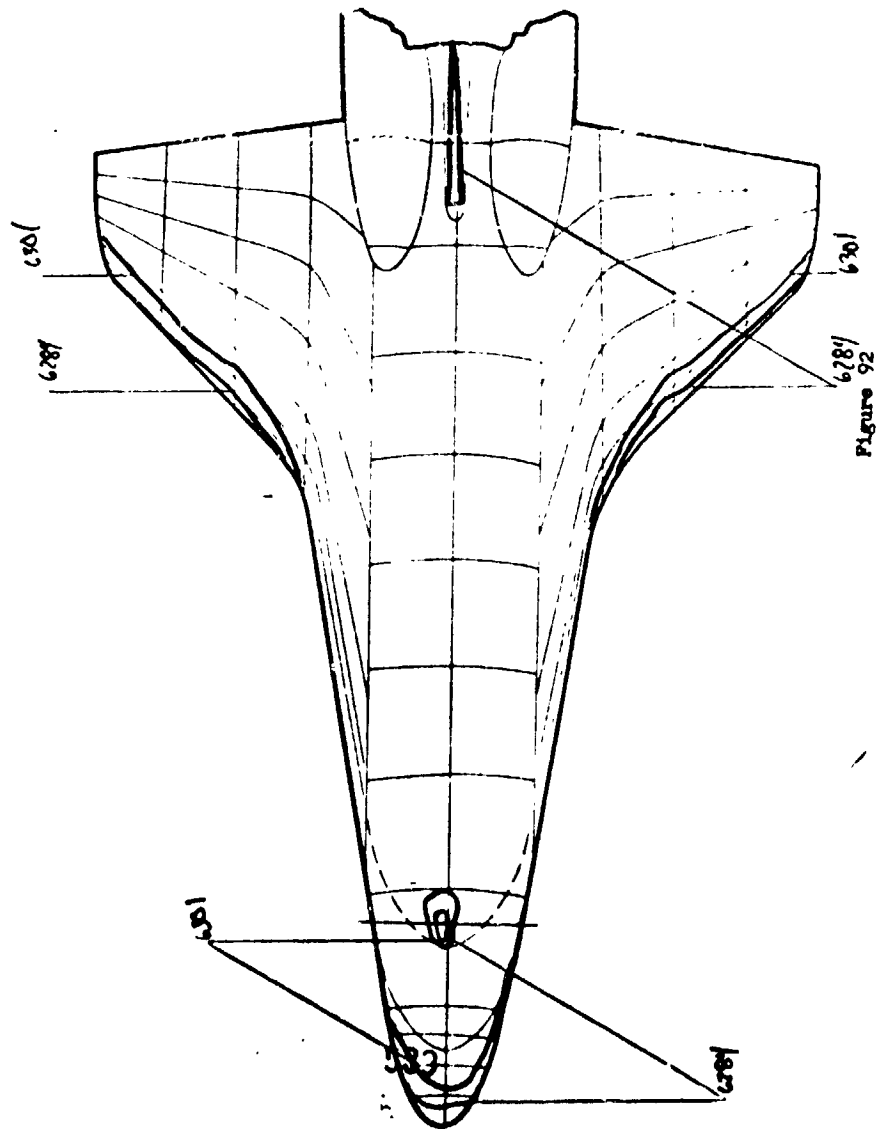


Figure 90

Group 81  
7747  
nd

4531  
 $\alpha = 35^\circ$   
 $\phi = 0^\circ$





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7/10/73

NASA-RT ORPITER PEATING

VA289

AEDCI(ARINC) ARNOLD AFS, TENNESSEE  
VON KARMAN GAS DYNAMICS FACILITY  
50 INCH HYPERSONIC TUNNEL R

GROUP CONFIG MODEL MACH NO PROPSIA TOIDEG RI ALPHA-MODEL ALPHA-SECTION ALPHA-PREBEND ROLL-MODEL YAW  
M1 2 ORPITER S 7.95 209.5 1283 35.06 HREF S1REF -180.00 -0.00

T-INF P-INF D-INF V-INF RHO-INF MU-INF DE/FT HREF S1REF  
(DEG R) (PSIA) (FT/SEC) (SLUGS/FT3) (LR-SEC/FT2) (FT-1) (R= .0175FT) (R= .0175FT)  
94.1 .022 .949 3778 1.994E-05 7.572E-08 9.947E 05 2.437E-02 4.077E-02

CAMERA ROLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHXCCK) TRAR(TO) BETA(TO)

TOP(T) 8351  
SIDE(S) 8063  
MOTIC(M) 7747

77 .0486 0 0

PIC NO TIME DELTIME H(TO) H(TO)/HREF H(.9TO) HREF H(.923TO) H(.923TO)/HREF ST(TO)

T 354(131) 1.19 MODEL HAS NOT REACHED CENTERLINE H(.9TO) HREF H(.923TO) HREF ST(TO)  
S 4033(131) 1.18 MODEL HAS NOT REACHED CENTERLINE  
M 4276(131) 1.18 MODEL HAS NOT REACHED CENTERLINE  
T 355(131) 2.25 MODEL HAS NOT REACHED CENTERLINE  
S 4034(131) 2.25 MODEL HAS NOT REACHED CENTERLINE  
M 4277(131) 2.25 MODEL HAS NOT REACHED CENTERLINE

INJECT TIME = 2.28

T 356(131) 3.30 DATA NOT YET VALID

S 4035(131) 3.33 DATA NOT YET VALID

M 4278(131) 3.33 DATA NOT YET VALID

T 357(131) 4.38 3.10 1.878E-03 .0770 2.297E-03 .0942 2.183E-03 .0895 3.108E-03

S 4036(131) 4.41 3.13 1.871E-03 .0767 2.288E-03 .0938 2.174E-03 .0891 3.096E-03

M 4279(131) 4.41 3.13 1.871E-03 .0767 2.288E-03 .0938 2.174E-03 .0891 3.096E-03

T 358(131) 5.46 4.18 1.618E-03 .0663 1.979E-03 .0771 1.881E-03 .0771 2.677E-03

S 4037(131) 5.46 4.18 1.618E-03 .0663 1.979E-03 .0771 1.881E-03 .0771 2.677E-03

M 4280(131) 5.48 4.20 1.614E-03 .0661 1.973E-03 .0769 1.875E-03 .0769 2.670E-03

T 359(131) 6.53 5.25 1.443E-03 .0591 1.765E-03 .0723 1.677E-03 .0723 2.387E-03

S 4038(131) 6.53 5.25 1.443E-03 .0591 1.765E-03 .0723 1.677E-03 .0723 2.387E-03

M 4281(131) 6.56 5.28 1.440E-03 .0590 1.760E-03 .0721 1.673E-03 .0721 2.380E-03

T 360(131) 7.61 6.33 1.315E-03 .0539 1.608E-03 .0659 1.528E-03 .0659 2.172E-03

S 4039(131) 7.61 6.33 1.315E-03 .0539 1.608E-03 .0659 1.528E-03 .0659 2.172E-03

M 4282(131) 7.61 6.33 1.315E-03 .0539 1.608E-03 .0659 1.528E-03 .0659 2.172E-03

T 361(131) 8.68 7.41 1.215E-03 .0458 1.484E-03 .0609 1.413E-03 .0609 2.009E-03

S 4040(131) 8.68 7.41 1.215E-03 .0458 1.484E-03 .0609 1.413E-03 .0609 2.009E-03

M 4283(131) 8.63 7.41 1.215E-03 .0458 1.484E-03 .0609 1.413E-03 .0609 2.009E-03

T 362(131) 9.74 8.44 1.137E-03 .0466 1.351E-03 .0570 1.322E-03 .0570 1.879E-03

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MASS-RI ORBITER HEATING  
 AEDC(ARO, INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL B

VA209

GROUP CONFIG MODEL MACH NO PO(PSIA) TO(DEG R) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREBEND ROLL-MODEL YAW  
 81 2 ORBITER S 7.95 210.3 1283 35.06 -5.06 -30.00 -180.00 -0.00  
 T-1NF P-1NF Q-1NF V-1NF MU-1NF RE/FT HREF STREF  
 (DEG R) (PSIA) (FT/SEC) (SLUGS/FT<sup>3</sup>) (LB-SEC/FT<sup>2</sup>) (FT-1) (R= .0175FT) (R= .0175FT)  
 94.1 .022 .993 377R 2.001E-05 7.573E-08 9.983E 05 2.441E-02 4.069E-02  
 CAMERA ROLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHOXCHK) TBAR(1TO) BETA(1TO)  
 TOP(T) 8251  
 SIDE(S) 8083  
 BOTTOM(B) 7747  
 131 77 .0486 7.239E-02 6.8064E-02

PIC NO	TIME DELTIVE	H(1TO)/HREF	H(.9TO)	H(.9TO)/HREF	H(.923TO)	H(.923TO)/HREF	ST(1TO)
S 4041(131)	9.76 8.4R	1.136E-03	1.389E-03	.0569	1.320E-03	.0541	1.876E-03
R 6294(131)	9.76 8.4R	1.136E-03	1.389E-03	.0569	1.320E-03	.0541	1.876E-03
M 6285(131)	10.81 9.53	1.071E-03	1.310E-03	.0536	1.245E-03	.0510	1.769E-03
T 7621(131)	10.84 9.54	1.070E-03	1.308E-03	.0536	1.244E-03	.0509	1.768E-03
S 4042(131)	10.84 9.54	1.070E-03	1.308E-03	.0536	1.244E-03	.0509	1.768E-03
T 3641(131)	11.89 10.61	1.016E-03	1.242E-03	.0508	1.180E-03	.0483	1.676E-03
M 6284(131)	11.89 10.61	1.016E-03	1.242E-03	.0508	1.180E-03	.0483	1.676E-03
S 4043(131)	11.91 10.64	1.014E-03	1.240E-03	.0508	1.179E-03	.0483	1.675E-03
T 3651(131)	12.56 11.69	9.676E-04	1.163E-03	.0484	1.125E-03	.0460	1.597E-03
M 6287(131)	12.56 11.69	9.676E-04	1.163E-03	.0484	1.125E-03	.0460	1.597E-03
S 4044(131)	12.59 11.71	9.666E-04	1.162E-03	.0484	1.123E-03	.0460	1.596E-03
T 3661(131)	14.04 12.76	9.259E-04	1.132E-03	.0464	1.076E-03	.0441	1.529E-03
S 4045(131)	14.04 12.76	9.259E-04	1.132E-03	.0464	1.076E-03	.0441	1.529E-03
M 6288(131)	14.04 12.76	9.259E-04	1.132E-03	.0464	1.076E-03	.0441	1.529E-03
T 3671(131)	15.09 13.81	8.900E-04	1.088E-03	.0445	1.034E-03	.0423	1.468E-03
S 4046(131)	15.12 13.84	8.892E-04	1.087E-03	.0445	1.033E-03	.0423	1.468E-03
T 3681(131)	16.17 14.89	8.572E-04	1.048E-03	.0429	9.963E-04	.0408	1.414E-03
S 4047(131)	16.19 14.91	8.565E-04	1.047E-03	.0429	9.955E-04	.0407	1.413E-03
M 6290(131)	16.19 14.91	8.565E-04	1.047E-03	.0429	9.955E-04	.0407	1.413E-03
T 3691(131)	17.24 15.97	8.279E-04	1.012E-03	.0414	9.622E-04	.0394	1.365E-03
S 4048(131)	17.27 15.98	8.272E-04	1.011E-03	.0414	9.614E-04	.0394	1.365E-03
T 3701(131)	18.32 17.04	8.013E-04	9.798E-04	.0401	9.313E-04	.0381	1.321E-03
M 6292(131)	18.32 17.04	8.013E-04	9.798E-04	.0401	9.313E-04	.0381	1.321E-03

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7/10/73

NASA-RT ORBITER HEATING AEDCTARD, INC.) ARNOLD AFS, TENNESSEE  
VON KARMAN GAS DYNAMICS FACILITY  
50 INCH HYPERSONIC TUNNEL R

VA289

GROUP CONFIG MODEL MACH NO PO (PSIA) TO (DEG R) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREBEND ROLL-MODEL YAW  
A1 2 ORBITER S 7.95 210.7 1283 35.05 -5.06 -30.00 -180.00 -0.00

T-INF P-INF Q-INF V-INF RHO-INF MU-INF RE/FT HREF STREF  
(DEG R) (PSIA) (PSIA) (FT/SEC) (SLUGS/FT<sup>3</sup>) (LB-SEC/FT<sup>2</sup>) (FT-1) (R= .0175FT) (R= .0175FT)  
94.1 .022 .994 3778 2.005E-05 7.573E-08 1.000E 06 2.444E-02 4.066E-02

CAMERA ROLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHOXCK) TRAR (TO) BETA (TO)  
TOP (T) 8351  
SIDE (S) 8063  
BOTTOM (B) 7747

7.239E-02 6.8064E-02

.0486

PIC NO	TIME DELT (SEC)	H (TO)	H (TO)/HREF	H (-9TO)	H (-9TO)/HREF	H (.923TO)	H (.923TO)/HREF	ST (TO)
S 4049 (131)	18.25	8.07E-04	.0328	9.791E-04	.0401	9.306E-04	.0381	1.320E-03
T 371 (131)	18.40	7.771E-04	.0318	9.503E-04	.0389	9.032E-04	.0370	1.281E-03
M 6293 (131)	18.40	7.771E-04	.0318	9.503E-04	.0389	9.032E-04	.0370	1.281E-03
S 4050 (131)	19.42	7.766E-04	.0318	9.496E-04	.0389	9.026E-04	.0369	1.281E-03
T 372 (131)	20.47	7.550E-04	.0309	9.232E-04	.0378	8.775E-04	.0359	1.245E-03
M 6294 (131)	20.47	7.550E-04	.0309	9.232E-04	.0378	8.775E-04	.0359	1.245E-03
S 4051 (131)	20.47	7.550E-04	.0309	9.232E-04	.0378	8.775E-04	.0359	1.245E-03
T 373 (131)	21.52	7.347E-04	.0301	8.944E-04	.0368	8.544E-04	.0350	1.211E-03
M 6295 (131)	21.52	7.347E-04	.0301	8.944E-04	.0368	8.544E-04	.0350	1.211E-03
S 4052 (131)	21.55	7.347E-04	.0301	8.944E-04	.0368	8.539E-04	.0349	1.212E-03
T 374 (131)	23.13	7.077E-04	.0289	8.644E-04	.0354	8.225E-04	.0336	1.166E-03
M 6296 (131)	23.13	7.077E-04	.0289	8.644E-04	.0354	8.225E-04	.0336	1.166E-03
S 4053 (131)	23.13	7.077E-04	.0289	8.644E-04	.0354	8.225E-04	.0336	1.166E-03
T 375 (131)	25.15	6.770E-04	.0277	8.278E-04	.0339	7.864E-04	.0322	1.116E-03
M 6297 (131)	25.15	6.770E-04	.0277	8.278E-04	.0339	7.864E-04	.0322	1.116E-03
S 4054 (131)	25.15	6.770E-04	.0277	8.278E-04	.0339	7.864E-04	.0322	1.116E-03
T 376 (131)	25.18	6.766E-04	.0277	8.274E-04	.0338	7.864E-04	.0322	1.115E-03
M 6298 (131)	25.18	6.766E-04	.0277	8.274E-04	.0338	7.864E-04	.0322	1.115E-03
S 4055 (131)	25.18	6.766E-04	.0277	8.274E-04	.0338	7.864E-04	.0322	1.115E-03
T 377 (131)	27.21	6.466E-04	.0266	7.944E-04	.0325	7.550E-04	.0309	1.070E-03
M 6299 (131)	27.21	6.466E-04	.0266	7.944E-04	.0325	7.550E-04	.0309	1.070E-03
S 4056 (131)	27.21	6.466E-04	.0266	7.944E-04	.0325	7.550E-04	.0309	1.070E-03
T 378 (131)	29.23	6.256E-04	.0256	7.650E-04	.0313	7.271E-04	.0297	1.030E-03
M 6300 (131)	29.23	6.256E-04	.0256	7.650E-04	.0313	7.271E-04	.0297	1.030E-03
S 4057 (131)	29.23	6.256E-04	.0256	7.650E-04	.0313	7.271E-04	.0297	1.030E-03
T 379 (131)	31.26	6.041E-04	.0247	7.387E-04	.0302	7.021E-04	.0287	9.944E-04
M 6301 (131)	31.26	6.041E-04	.0247	7.387E-04	.0302	7.021E-04	.0287	9.944E-04
S 4058 (131)	31.26	6.041E-04	.0247	7.387E-04	.0302	7.021E-04	.0287	9.944E-04

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7/10/73

NASA-PI ORBITER HEATING  
 VA289  
 AEDC(ARO, INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL R

GROUP	CONFIG	MODE	MACH NO	PO(PSIA)	TO( DEG R)	ALPHA-MODEL	ALPHA-SECTOR	ALPHA-PREBEND	ROLL-MODEL	YAW
R1	2	ORBITER S	7.95	211.1	1283	35.06	-5.06	-30.00	-180.00	--.00
T-1NF	P-1NF	O-1NF	Y-1NF	RHO-1NF	MU-1NF	RF/FT	HREF	STREF		
(DEG R)	(PSIA)	(FT/SEC)	(SLUGS/FT3)	(LR-SEC/FT2)	(FT-1)	(R=)	(R=)	(R=)		
94.1	.023	.996	3774	2.009E-05	7.573E-08	1.002E 06	2.446E-02	4.062E-02		
CAMERA	ROLL NO	PAINT	TEMP (DEG F)	INITIAL TEMP (DEG F)	SQUARE ROOT (RHOXCK)	TRAR(TO)	BETA(TO)			
TOP(IT)	8351									
SIDE(S)	8063									
MOTTOM(8)	7747									

PTC NO	TIME DELTME	H(TO)	HREF	H(-9T0)	H(-9T0)/HREF	H(-923T0)	H(-923T0)/HREF	ST(TO)
T 379(131)	33.29	32.01	5.847E-04	.0239	7.149E-04	.0292	6.795E-04	.0278
S 4058(131)	33.31	32.03	5.844E-04	.0239	7.146E-04	.0292	6.793E-04	.0278
M 6301(131)	33.31	32.03	5.844E-04	.0239	7.146E-04	.0292	6.793E-04	.0278
	34.49							
T 380(131)	35.24	34.06	5.668E-04	.0232	6.931E-04	.0283	6.587E-04	.0269
S 4059(131)	35.24	34.06	5.668E-04	.0232	6.931E-04	.0283	6.587E-04	.0269
M 6302(131)	35.24	34.06	5.668E-04	.0232	6.931E-04	.0283	6.587E-04	.0269

Group 82  
8063  
105

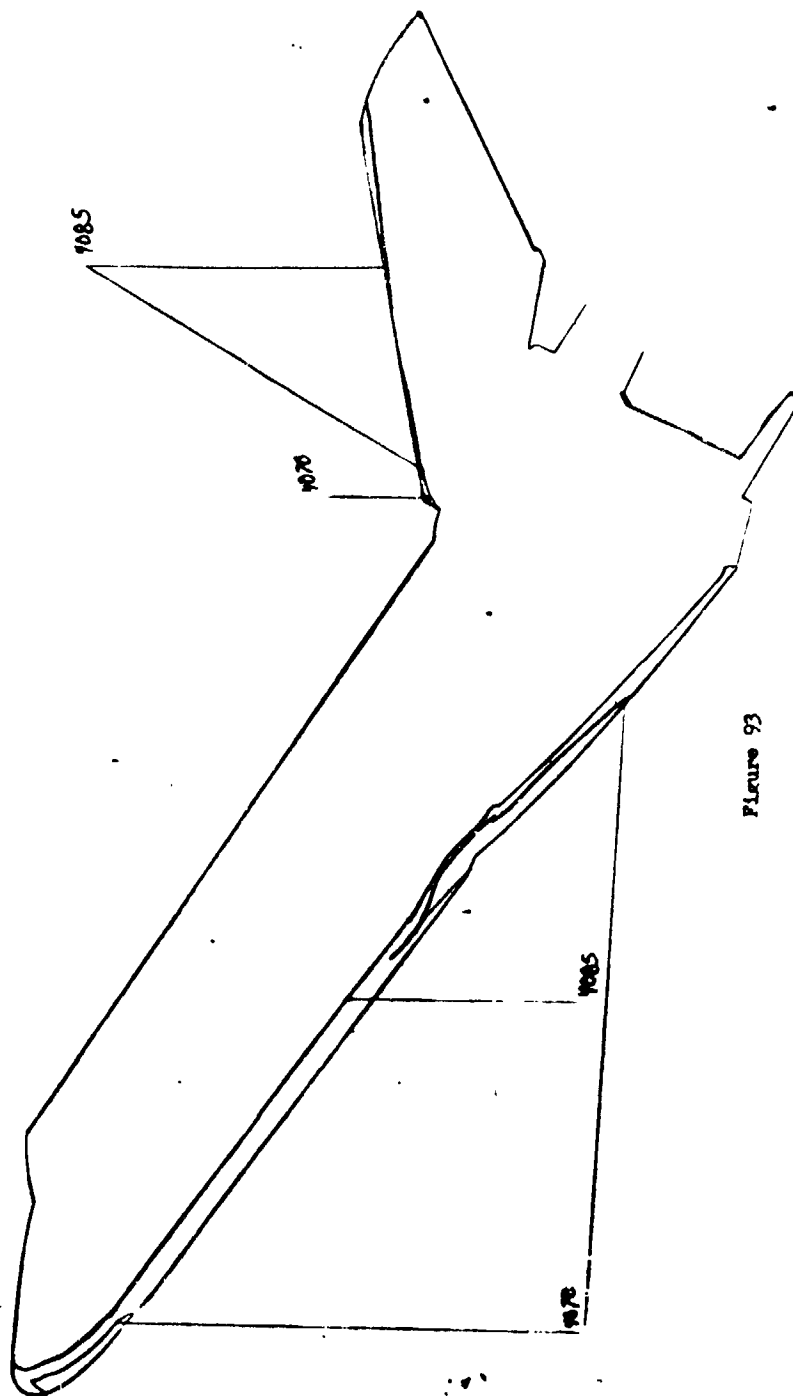


Figure 93



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NASA-RT ORBITER HEATING  
AEDC(ARO-INC.) ARNOLD AFS, TENNESSEE  
VON KARMAN GAS DYNAMICS FACILITY  
50 INCH HYPERSONIC TUNNEL A

VA299

GROUP CONFIG MODEL MACH NO PO(PSIA) 10(DEG R) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREBEND ROLL-MODEL YAW  
P2 7 ORBITER R4 7.95 210.1 1288 35.05 -5.05 -30.00 -180.00 -0.00

T-INF P-INF Q-INF V-INF MU-INF MU-INF RE/FT HREF STREF  
(DEG R) (PSIA) (FT/SEC) (SLUGS/FT<sup>3</sup>) (LB-SEC/FT<sup>2</sup>) (FT-1) (R= .0175FT) (R= .0175FT)  
94.4 .072 .092 376.5 1.002E-05 7.601E-08 9.919E 05 2.442E-02 4.088E-02

CAMERA ROLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHOXCK) TRAR(10) BETAIT(0)  
TOP(T) 8351  
SIDE(S) 8063 250 71 .0535 0  
BOTTOM(B) 7747

PIC NO TIME RELTIME HITO) HREF H(.9TO) HREF H(.923TO) H(.923TO)/HREF ST(10)

T 391(250) 1.18 MODEL WAS NOT REACHED CENTERLINE 9.444E-03 .3945 9.073E-03 .3712 1.247E-02  
S 406(250) 1.18 MODEL WAS NOT REACHED CENTERLINE 9.444E-03 .3945 9.073E-03 .3712 1.247E-02  
M 430(250) 1.18 MODEL WAS NOT REACHED CENTERLINE 9.444E-03 .3945 9.073E-03 .3712 1.247E-02  
T 392(250) 2.25 MODEL WAS NOT REACHED CENTERLINE 8.718E-03 .3403 7.826E-03 .3201 1.076E-02  
S 406(250) 2.25 MODEL WAS NOT REACHED CENTERLINE 8.718E-03 .3403 7.826E-03 .3201 1.076E-02  
M 430(250) 2.25 MODEL WAS NOT REACHED CENTERLINE 8.718E-03 .3403 7.826E-03 .3201 1.076E-02  
INJECT TIME = 2.28 DATA NOT YET VALID

T 391(250) 3.33 DATA NOT YET VALID 9.444E-03 .3945 9.073E-03 .3712 1.247E-02  
S 406(250) 3.33 DATA NOT YET VALID 9.444E-03 .3945 9.073E-03 .3712 1.247E-02  
M 430(250) 3.33 DATA NOT YET VALID 9.444E-03 .3945 9.073E-03 .3712 1.247E-02  
T 392(250) 4.41 7.505E-03 .3107 9.444E-03 .3945 9.073E-03 .3712 1.247E-02  
S 406(250) 4.41 7.505E-03 .3107 9.444E-03 .3945 9.073E-03 .3712 1.247E-02  
M 430(250) 4.41 7.505E-03 .3107 9.444E-03 .3945 9.073E-03 .3712 1.247E-02  
T 392(250) 5.46 6.570E-03 .2686 8.718E-03 .3403 7.826E-03 .3201 1.076E-02  
S 406(250) 5.46 6.570E-03 .2686 8.718E-03 .3403 7.826E-03 .3201 1.076E-02  
M 430(250) 5.46 6.570E-03 .2686 8.718E-03 .3403 7.826E-03 .3201 1.076E-02  
T 392(250) 6.53 5.855E-03 .2396 7.440E-03 .3043 6.999E-03 .2863 9.621E-03  
S 406(250) 6.53 5.855E-03 .2396 7.440E-03 .3043 6.999E-03 .2863 9.621E-03  
M 430(250) 6.53 5.855E-03 .2396 7.440E-03 .3043 6.999E-03 .2863 9.621E-03  
T 392(250) 7.61 5.377E-03 .2143 6.778E-03 .2772 6.376E-03 .2608 8.760E-03  
S 406(250) 7.61 5.377E-03 .2143 6.778E-03 .2772 6.376E-03 .2608 8.760E-03  
M 430(250) 7.61 5.377E-03 .2143 6.778E-03 .2772 6.376E-03 .2608 8.760E-03  
T 392(250) 8.68 4.944E-03 .2017 6.266E-03 .2562 5.895E-03 .2410 8.095E-03  
S 406(250) 8.68 4.944E-03 .2017 6.266E-03 .2562 5.895E-03 .2410 8.095E-03  
M 430(250) 8.68 4.944E-03 .2017 6.266E-03 .2562 5.895E-03 .2410 8.095E-03  
T 392(250) 9.76 4.611E-03 .1846 5.855E-03 .2395 5.504E-03 .2253 7.571E-03  
S 406(250) 9.76 4.611E-03 .1846 5.855E-03 .2395 5.504E-03 .2253 7.571E-03  
M 430(250) 9.76 4.611E-03 .1846 5.855E-03 .2395 5.504E-03 .2253 7.571E-03

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NASA-RI ORBITER HEATING  
VA249  
AEDC(ARO, INC.) ARNOLD AFS, TENNESSEE  
VON KARMAN GAS DYNAMICS FACILITY  
50 INCH HYPERSONIC TUNNEL R

GROUP CONFIG MODEL MACH NO PO (PSIA) TO (DEG R) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREBEND ROLL-MODEL YAW  
P2 7 ORBITER RA 7.95 210.6 1208 35.05 -5.05 -30.00 -180.00 -0.00  
T-INF P-INF Q-INF V-INF (FT/SEC) (SLUGS/FT<sup>3</sup>) (LH-SEC/FT<sup>2</sup>) (FT-1) HREF STREF  
(DEG R) (PSIA) (PSIA) (FT/SEC) (SLUGS/FT<sup>3</sup>) (LH-SEC/FT<sup>2</sup>) (FT-1) (R= .0175FT) (R= .0175FT)  
96.4 -0.22 .944 3785 1.99E-05 7.60E-08 5.44E 05 2.44E-02 4.07E-02

CAMERA ROLL NO PAIR TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHOCXCK) TRAR(TO) BETA(TO)  
TOP(IT) 8351  
SIDE(S) 8063  
BOTTOM(B) 7747  
250  
.0535  
2.304E-01 2.5100E-01

PIC N1	TIME DELTIVE	H(TO)	H(TO)/HREF	M(.910)	M(.910)/HREF	M(.923TO)	M(.923TO)/HREF	ST(TO)
T 350(250)	10.64	9.56	4.343E-03	5.516E-03	.2255	5.189E-03	.2122	7.126E-03
S 4069(250)	10.84	9.54	4.343E-03	5.516E-03	.2255	5.189E-03	.2122	7.126E-03
M 6312(250)	10.84	9.54	4.343E-03	5.516E-03	.2255	5.189E-03	.2122	7.126E-03
T 391(250)	11.89	10.81	4.123E-03	5.229E-03	.2139	4.919E-03	.2012	6.760E-03
S 4070(250)	11.91	10.84	4.118E-03	5.229E-03	.2139	4.919E-03	.2012	6.759E-03
M 6314(250)	11.91	10.84	4.118E-03	5.229E-03	.2139	4.919E-03	.2012	6.759E-03
T 392(250)	12.46	11.49	3.928E-03	4.988E-03	.2040	4.693E-03	.1919	6.445E-03
S 4071(250)	12.49	11.71	3.924E-03	4.983E-03	.2037	4.688E-03	.1917	6.438E-03
M 6315(250)	12.59	11.71	3.924E-03	4.983E-03	.2037	4.688E-03	.1917	6.438E-03
T 393(250)	12.75	12.75	3.759E-03	4.773E-03	.1951	4.491E-03	.1836	6.164E-03
S 4072(250)	14.07	12.79	3.755E-03	4.769E-03	.1950	4.486E-03	.1834	6.161E-03
M 6316(250)	15.12	13.84	3.610E-03	4.584E-03	.1873	4.313E-03	.1762	5.917E-03
T 394(250)	15.14	13.84	3.606E-03	4.580E-03	.1873	4.309E-03	.1762	5.917E-03
S 4073(250)	15.14	13.84	3.606E-03	4.580E-03	.1873	4.309E-03	.1762	5.917E-03
T 395(250)	16.19	14.91	3.477E-03	4.416E-03	.1805	4.154E-03	.1698	5.705E-03
S 4074(250)	16.19	14.91	3.477E-03	4.416E-03	.1805	4.154E-03	.1698	5.705E-03
M 6317(250)	16.22	14.94	3.474E-03	4.412E-03	.1803	4.151E-03	.1697	5.697E-03
T 396(250)	17.27	15.99	3.358E-03	4.264E-03	.1743	4.012E-03	.1640	5.507E-03
S 4075(250)	17.27	15.99	3.358E-03	4.264E-03	.1743	4.012E-03	.1640	5.507E-03
M 6318(250)	17.27	15.99	3.358E-03	4.264E-03	.1743	4.012E-03	.1640	5.507E-03
T 397(250)	17.29	16.02	3.355E-03	4.261E-03	.1742	4.009E-03	.1639	5.505E-03
S 4076(250)	18.35	17.07	3.250E-03	4.128E-03	.1687	3.883E-03	.1587	5.330E-03
M 6319(250)	18.35	17.07	3.250E-03	4.128E-03	.1687	3.883E-03	.1587	5.330E-03
T 398(250)	19.42	18.14	3.153E-03	4.003E-03	.1636	3.766E-03	.1539	5.167E-03
S 4077(250)	19.42	18.14	3.153E-03	4.003E-03	.1636	3.766E-03	.1539	5.167E-03
M 6320(250)	19.42	18.14	3.153E-03	4.003E-03	.1636	3.766E-03	.1539	5.167E-03

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AEDC(ARO,INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL R

NASA-RI ORBITER HEATING

VAP29

GROUP CONFIG MODEL MACH NO POISSIA TO(DEG R) ALPHA-MODEL ALPHA-SECTION ALPHA-PREBEND ROLL-MODEL YAW  
 R2 7 ONEITER PA 7.95 211.0 1288 35.05 -5.05 -30.00 -180.00 -0.00

T-1AF P-1NF U-1NF V-1NF MU-1NF RE/FT MREF STREF  
 (DEG R) (PSIA) (PSIA) (FT/SEC) (SLUGS/FT<sup>3</sup>) (LR-SEC/FT<sup>2</sup>) (F-11) (R= .0175FT) (R= .0175FT)  
 94.4 .023 .996 3785 2.000E-05 7.603E-08 9.95RE 05 2.447E-02 4.072E-02

CAMERA ROLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHOXCK) 1RR(10) BETA(10)  
 TOP(1) 8251 77 .0535 2.304E-01 2.5100E-01  
 S10F(S) 8063  
 BOTTOM(MR) 7747

PIC NO	TIME	DELTIME	M(10)	M(10)/MREF	M(.910)	M(.910)/MREF	M(.923TO)	M(.923TO)/MREF	ST(10)
T 199(250)	20.50	19.22	3.063E-03	.1252	3.098E-03	.1250	3.659E-03	.1495	5.021E-03
S 407H(250)	20.50	19.22	3.063E-03	.1252	3.098E-03	.1250	3.659E-03	.1495	5.021E-03
M 421(250)	20.50	19.22	3.063E-03	.1252	3.098E-03	.1250	3.659E-03	.1495	5.021E-03
T 400(250)	21.57	20.30	2.941E-03	.1218	3.783E-03	.1247	3.561E-03	.1456	4.888E-03
S 407H(250)	21.57	20.30	2.941E-03	.1218	3.783E-03	.1247	3.561E-03	.1456	4.888E-03
M 422(250)	21.57	20.30	2.941E-03	.1218	3.783E-03	.1247	3.561E-03	.1456	4.888E-03
T 401(250)	22.63	21.35	2.906E-03	.1189	3.691E-03	.1208	3.472E-03	.1419	4.764E-03
S 407H(250)	22.63	21.35	2.906E-03	.1189	3.691E-03	.1208	3.472E-03	.1419	4.764E-03
M 423(250)	22.63	21.35	2.906E-03	.1189	3.691E-03	.1208	3.472E-03	.1419	4.764E-03
T 401(250)	22.65	21.37	2.905E-03	.1187	3.689E-03	.1207	3.470E-03	.1418	4.761E-03
S 407H(250)	22.65	21.37	2.905E-03	.1187	3.689E-03	.1207	3.470E-03	.1418	4.761E-03
M 424(250)	22.65	21.37	2.905E-03	.1187	3.689E-03	.1207	3.470E-03	.1418	4.761E-03
T 401(250)	24.55	23.27	2.783E-03	.1137	3.535E-03	.1145	3.325E-03	.1159	4.503E-03
S 407H(250)	24.55	23.27	2.783E-03	.1137	3.535E-03	.1145	3.325E-03	.1159	4.503E-03
M 425(250)	24.55	23.27	2.783E-03	.1137	3.535E-03	.1145	3.325E-03	.1159	4.503E-03
T 401(250)	26.58	25.30	2.670E-03	.1091	3.390E-03	.1186	3.189E-03	.1304	4.378E-03
S 407H(250)	26.58	25.30	2.670E-03	.1091	3.390E-03	.1186	3.189E-03	.1304	4.378E-03
M 426(250)	26.58	25.30	2.670E-03	.1091	3.390E-03	.1186	3.189E-03	.1304	4.378E-03
T 404(250)	28.63	27.35	2.584E-03	.1049	3.261E-03	.1332	3.067E-03	.1253	4.205E-03
S 407H(250)	28.63	27.35	2.584E-03	.1049	3.261E-03	.1332	3.067E-03	.1253	4.205E-03
M 427(250)	28.63	27.35	2.584E-03	.1049	3.261E-03	.1332	3.067E-03	.1253	4.205E-03
T 405(250)	30.66	29.38	2.477E-03	.1012	3.146E-03	.1246	2.960E-03	.1210	4.061E-03
M 428(250)	30.66	29.38	2.477E-03	.1012	3.146E-03	.1246	2.960E-03	.1210	4.061E-03
T 404(250)	32.69	31.41	2.346E-03	.0979	3.043E-03	.1243	2.863E-03	.1169	3.924E-03
S 407H(250)	32.69	31.41	2.346E-03	.0979	3.043E-03	.1243	2.863E-03	.1169	3.924E-03
M 429(250)	32.69	31.41	2.346E-03	.0979	3.043E-03	.1243	2.863E-03	.1169	3.924E-03
T 406(250)	34.74	33.46	2.321E-03	.0948	2.948E-03	.1204	2.773E-03	.1133	3.804E-03
S 407H(250)	34.74	33.46	2.321E-03	.0948	2.948E-03	.1204	2.773E-03	.1133	3.804E-03
M 430(250)	34.74	33.46	2.321E-03	.0948	2.948E-03	.1204	2.773E-03	.1133	3.804E-03

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AEDCI(ARO, INC.) ARNOLD AFS, TENNESSEE  
VON KARMAN GAS DYNAMICS FACILITY  
50 INCH HYPERSONIC TUNNEL A

7/10/73

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UNCLASSIFIED  
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NASA-PI ORBITER HEATING

VA289

GROUP CONFIG MODEL MACH NO PO(PSIA) TO(DEG R) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREBEND ROLL-MODEL YAW

82 7 ORBITER A4 7.95 211.1 1288 35.05 -5.05 -30.00 -180.00 --.00

Y-1AF P-1NF O-1NF V-1NF RMO-1NF MU-1NF RE/FT HREF STREF

IDEGR (PSIA) (PSIA) (PSIA) (FT/SEC) (SLUGS/FT<sup>2</sup>) (FT-1) (R= .0175FT) (R= .0175FT)

94.4 .023 .996 3784 2.001E-05 7.604E-08 9.960E 05 2.448E-02 4.072E-02

CAMERA POLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RMSCAK) TRAR(ITO) BETA(ITO)

TOP(T) 8231 77 .0535 2.304E-01 2.5100E-01

SIDE(S) 8063

WOTTON(R) 7767

PIC NO	TIME DELTTYPE	M(TO)	M(TO)/MREF	M(.9TO)	M(.9TO)/MREF	M(.923TO)	M(.923TO)/MREF	ST(TO)
M 6330(250)	36.64	MODEL HAS LEFT CENTERLINE						
T 408(250)	36.77	75.49	2.254E-03	.0921	2.863E-03	.1169	2.693E-03	.1100 3.692E-03
S 4087(250)	36.79	35.51	2.253E-03	.0921	2.862E-03	.1169	2.692E-03	.1100 3.692E-03
T 409(250)	36.79	35.51	2.253E-03	.0921	2.862E-03	.1169	2.692E-03	.1100 3.692E-03
S 4088(250)	38.82	37.54	2.192E-03	.0895	2.783E-03	.1137	2.618E-03	.1070 3.591E-03
M 6331(250)	38.82	37.54	2.192E-03	.0895	2.783E-03	.1137	2.618E-03	.1070 3.591E-03
T 410(250)	40.85	39.57	2.135E-03	.0872	2.711E-03	.1107	2.550E-03	.1042 3.496E-03
S 4089(250)	40.85	39.57	2.135E-03	.0872	2.711E-03	.1107	2.550E-03	.1042 3.496E-03
M 6332(250)	40.87	39.59	2.134E-03	.0872	2.710E-03	.1107	2.550E-03	.1041 3.495E-03

8351  
6783  
6300

8595  
 $\alpha = 30^\circ$   
 $\phi = 7^\circ$

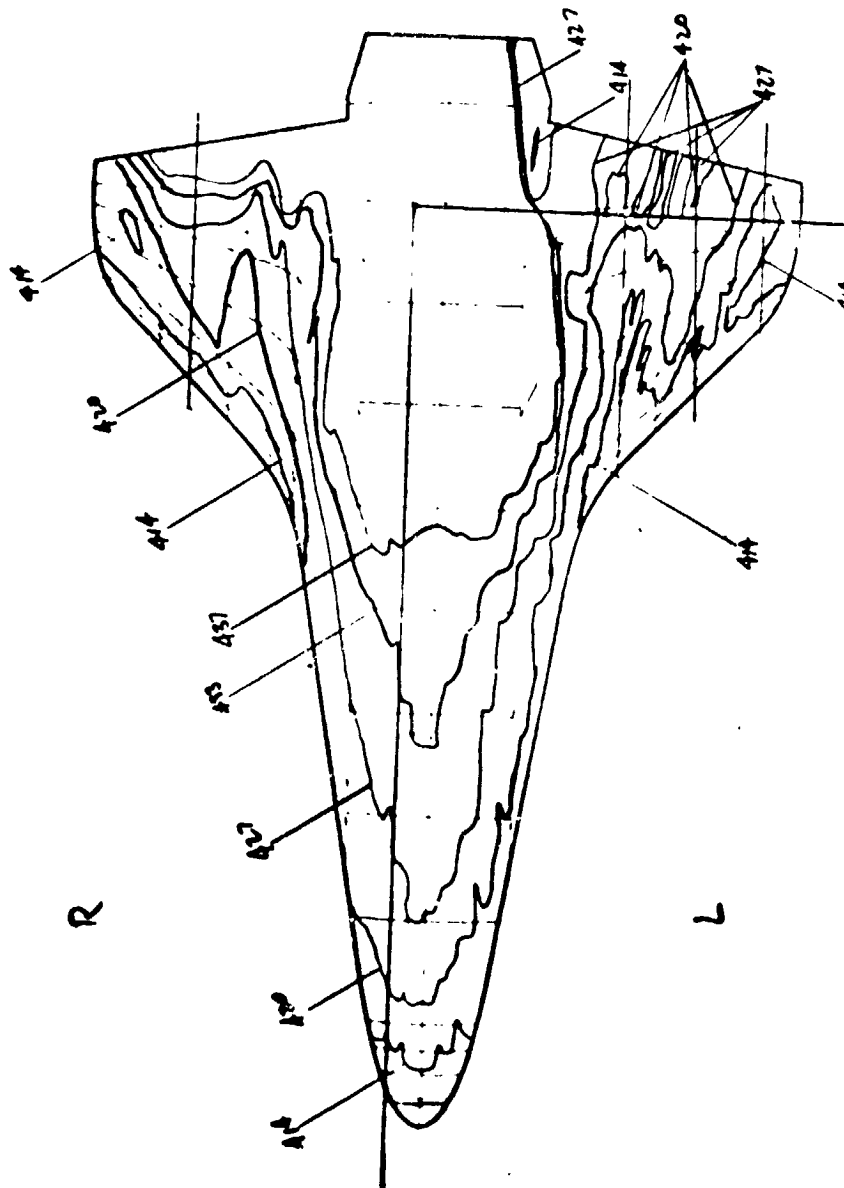


Figure 95

Group 83  
7747

4528  
 $\alpha = 30^\circ$   
 $\phi = 0^\circ$

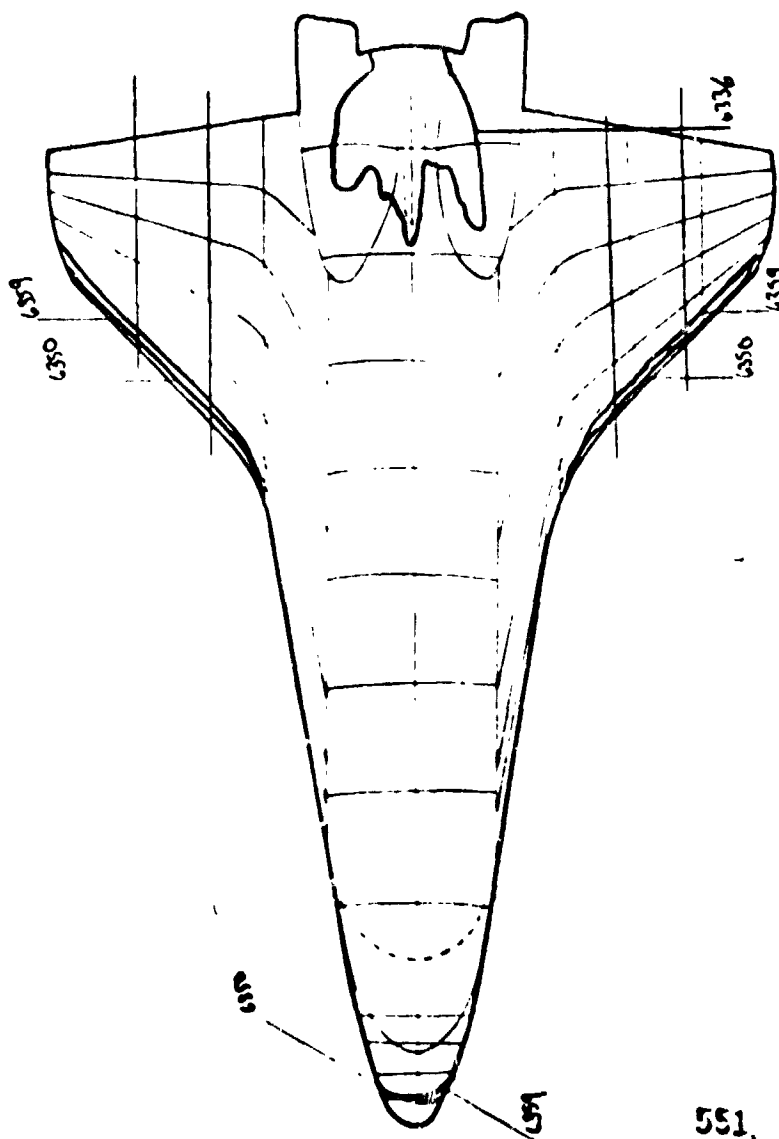


Figure 96

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7710773

MASA-VI ORBITER HEATING  
AFDC(ARO, INC.) ARNOLD AFS, TENNESSEE  
VON KARMAN GAS DYNAMICS FACILITY  
50 INCH HYPERSONIC TUNNEL R

VA280

GROUP	CONFIG	MODEL	NACH NO	PO(PSIA)	TO(DEG R)	ALPHA-SECTOR	ALPHA-PREBEND	ROLL-MODEL	YAW
B3	4	ORBITER B3	1.5	210.0	1284	34.02	-30.00	-180.00	-0.00
T-1AF	P-1NF	O-1NF	V-1NF	RHO-1NF	MU-1NF	DE/FT	HREF	STKc	
IDEG M	(PSIA)	(FT/SEC)	(SLUGS/FT3)	(LB-SEC/FT3)	(FT-1)	(R= .0175FT)	(INP .0175FT)		
96.9	.022	.391	3794	1.982F-08	7.657E-08	9.445E 05	2.443E-02	4.093E-02	
CAMERA	ROLL NO	PAINT TEMP (DEG F)	INITIAL TEMP (DEG F)	UARE ROOT (RHOXCAK)	THAR(ITO)	BETA(ITO)			
TOP(IT)	8351								
SIDE(15)	8063								
NOTICEM(R)	7747								

FIC NO	TIME RELTIME	MITOI	M(ITO)/HREF	M(-910)	M(0.010)/HREF	M(-.912TO)	M(0.912TO)/HREF	ST(ITO)
T 41112001	1.15	MODEL HAS NOT REACHED CENTERLINE						
M 41112001	1.15	MODEL HAS NOT REACHED CENTERLINE						
S 41112001	1.15	MODEL HAS NOT REACHED CENTERLINE						
T 41212001	2.23	MODEL HAS NOT REACHED CENTERLINE						
S 41212001	2.23	MODEL HAS NOT REACHED CENTERLINE						
M 41212001	2.23	MODEL HAS NOT REACHED CENTERLINE						
INJECT TIME =	2.25							
T 41312001	3.20	DATA NOT YET VALID						
S 41312001	3.20	DATA NOT YET VALID						
M 41312001	3.20	DATA NOT YET VALID						
T 41412001	4.28	3.12	4.754E-03	5.923E-03	5.923E-03	5.923E-03	5.923E-03	7.844E-03
S 41412001	4.28	3.12	4.754E-03	5.923E-03	5.923E-03	5.923E-03	5.923E-03	7.844E-03
M 41412001	4.28	3.12	4.754E-03	5.923E-03	5.923E-03	5.923E-03	5.923E-03	7.844E-03
T 41512001	5.6	4.19	4.044E-03	5.107E-03	5.107E-03	5.107E-03	5.107E-03	6.765E-03
S 41512001	5.6	4.19	4.044E-03	5.107E-03	5.107E-03	5.107E-03	5.107E-03	6.765E-03
M 41512001	5.6	4.19	4.044E-03	5.107E-03	5.107E-03	5.107E-03	5.107E-03	6.765E-03
T 41612001	6.53	5.27	3.646E-03	4.555E-03	4.555E-03	4.555E-03	4.555E-03	6.029E-03
S 41612001	6.53	5.27	3.646E-03	4.555E-03	4.555E-03	4.555E-03	4.555E-03	6.029E-03
M 41612001	6.53	5.27	3.646E-03	4.555E-03	4.555E-03	4.555E-03	4.555E-03	6.029E-03
T 41712001	7.61	6.32	3.338E-03	4.159E-03	4.159E-03	4.159E-03	4.159E-03	5.505E-03
S 41712001	7.61	6.32	3.338E-03	4.159E-03	4.159E-03	4.159E-03	4.159E-03	5.505E-03
M 41712001	7.61	6.32	3.338E-03	4.159E-03	4.159E-03	4.159E-03	4.159E-03	5.505E-03
T 41812001	8.66	7.44	3.046E-03	3.845E-03	3.845E-03	3.845E-03	3.845E-03	5.089E-03
S 41812001	8.66	7.44	3.046E-03	3.845E-03	3.845E-03	3.845E-03	3.845E-03	5.089E-03
M 41812001	8.66	7.44	3.046E-03	3.845E-03	3.845E-03	3.845E-03	3.845E-03	5.089E-03
T 41912001	9.74	8.67	2.843E-03	3.592E-03	3.592E-03	3.592E-03	3.592E-03	4.754E-03
S 41912001	9.74	8.67	2.843E-03	3.592E-03	3.592E-03	3.592E-03	3.592E-03	4.754E-03
M 41912001	9.74	8.67	2.843E-03	3.592E-03	3.592E-03	3.592E-03	3.592E-03	4.754E-03

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7/16/73

NASA-RT ORBITER HEATING  
AEDC(ARO, INC.) ARNOLD AFS, TENNESSEE  
VON KARMAN GAS DYNAMICS FACILITY  
50 INCH HYPERSONIC TUNNEL #

VA299

GROUP COMFTG MODEL MACH NO PO(PSTA) TO(IEG R) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREBEND ROLL-MODEL YAW  
83 4 ORBITER R3 7.95 210.7 1294 30.02 -.02 -.000 -180.00 -.00

T-INF P-INF Q-INF V-INF RHO-INF MU-INF RE/FT ST/EF  
1000 (PSIA) (PSIA) (FT/SEC) (SLUGS/FT3) (LB-SEC/FT2) (FT-1) (R= .0175FT) (R= .0175FT)  
94.9 .022 .994 3764 1.988E-05 7.638E-08 9.875E 05 2.447E-02 4.087E-02

CAMERA ROLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHOXCK) TRAR(TO) BETA(TO)

TOP(T) 8351  
SIDE(S) 8063  
BOTTOM(B) 7747

1.592E-01 1.6168E-01

PIC NO	TIME RELTIME	H(TO)	H(TO)/HREF	H(.9TO)	HREF H	H(.912TO)	HREF	ST(TO)
T 4201(200)	10.79	9.52	2.719E-03	.1111	3.398E-03	.1344	3.27E-03	.1343
R 6342(200)	10.79	9.52	2.719E-03	.1111	3.398E-03	.1344	3.27E-03	.1343
S 4999(200)	10.81	9.55	2.716E-03	.1109	3.384E-03	.1342	3.283E-03	.1341
T 4211(200)	11.86	10.61	2.577E-03	.1053	3.211E-03	.1312	3.116E-03	.1273
S 4100(200)	11.86	10.61	2.577E-03	.1053	3.211E-03	.1312	3.116E-03	.1273
H 6343(200)	11.86	10.61	2.577E-03	.1053	3.211E-03	.1312	3.116E-03	.1273
S 4101(200)	12.91	11.65	2.458E-03	.1004	3.065E-03	.1251	2.972E-03	.1213
T 4221(200)	12.94	11.68	2.456E-03	.1003	3.060E-03	.1250	2.969E-03	.1213
H 6344(200)	12.94	11.68	2.456E-03	.1003	3.060E-03	.1250	2.969E-03	.1213
T 4231(200)	13.59	12.73	2.352E-03	.0991	2.931E-03	.1197	2.843E-03	.1161
H 6345(200)	13.59	12.73	2.352E-03	.0991	2.931E-03	.1197	2.843E-03	.1161
S 4102(200)	14.02	12.75	2.350E-03	.0990	2.928E-03	.1196	2.840E-03	.1160
T 4241(200)	15.07	13.80	2.259E-03	.0922	2.814E-03	.1149	2.730E-03	.1115
S 4103(200)	15.07	13.80	2.259E-03	.0922	2.814E-03	.1149	2.730E-03	.1115
H 6346(200)	15.07	13.80	2.259E-03	.0922	2.814E-03	.1149	2.730E-03	.1115
T 4251(200)	16.12	14.85	2.177E-03	.0889	2.713E-03	.1108	2.632E-03	.1075
H 6347(200)	16.12	14.85	2.177E-03	.0889	2.713E-03	.1108	2.632E-03	.1075
S 4104(200)	16.14	14.88	2.175E-03	.0889	2.710E-03	.1107	2.630E-03	.1074
T 4261(200)	17.19	15.93	2.102E-03	.0859	2.619E-03	.1070	2.541E-03	.1038
H 6348(200)	17.19	15.93	2.102E-03	.0859	2.619E-03	.1070	2.541E-03	.1038
T 4271(200)	17.22	15.96	2.101E-03	.0859	2.618E-03	.1069	2.539E-03	.1037
H 6349(200)	17.22	15.96	2.101E-03	.0859	2.618E-03	.1069	2.539E-03	.1037
S 4105(200)	18.27	17.01	2.035E-03	.0831	2.535E-03	.1035	2.460E-03	.1004
T 4281(200)	18.27	17.01	2.035E-03	.0831	2.535E-03	.1035	2.460E-03	.1004
H 6350(200)	18.27	17.01	2.035E-03	.0831	2.535E-03	.1035	2.460E-03	.1004
T 4291(200)	19.32	18.04	1.975E-03	.0804	2.460E-03	.1004	2.387E-03	.0974

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7/10/73

NASA-RI ORBITER HEATING BEDCARD, INC.) ARNOLD AFS, TENNESSEE  
VON KARMAN GAS DYNAMICS FACILITY  
50 INCH HYPERSONIC TUNNEL B

VA249

GROUP COMPTO MODEL MACH NO PO(PDIA) TO(IDE R) ALPHA-MODEL ALPHA-SECTION ALPHA-PREBEND ROLL-MODEL YAW  
R3 6 ORBITER R3 7.95 211.1 1294 30.22 -.02 -30.00 -100.00 -.00

1-TAF P-INF Q-INF V-INF MU-INF RE/FT HREF STREF

IDEG R) (PSIA) (FT/SEC) (SLUGS/FT3) (L4-SEC/FT2) (FT-1) (R=.0175FT) (R=.0175FT)  
94.0 .023 .996 3795 1.991E-05 7.639E-08 9.90E 05 2.450E-02 4.083E-02

CAMERA ROLL NO PAINT TFP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RH0XCK) TBAR(TO) BETA(TO)

TOP(T) 8351  
SIDE(S) 8063  
WATCHER) 7147

1.592E-01 1.6160E-01

PIC NO	TIME DELTIME	H(TO)	HREF	H(.9TO)	HREF	H(.912TO)	H(.912TO)/HREF	ST(TO)
T 428(200)	19.25	1.973E-03	.0806	2.459E-03	.1004	2.385E-03	.0974	3.250E-03
S 4107(200)	19.35	1.973E-03	.0806	2.459E-03	.1004	2.385E-03	.0974	3.250E-03
T 429(200)	20.40	1.918E-03	.0783	2.390E-03	.0976	2.319E-03	.0947	3.158E-03
S 4108(200)	20.40	1.918E-03	.0783	2.390E-03	.0976	2.319E-03	.0947	3.158E-03
M 4251(200)	20.40	1.918E-03	.0783	2.390E-03	.0976	2.319E-03	.0947	3.158E-03
T 430(200)	21.47	1.867E-03	.0762	2.326E-03	.0950	2.256E-03	.0921	3.074E-03
S 4109(200)	21.47	1.867E-03	.0762	2.326E-03	.0950	2.256E-03	.0921	3.074E-03
M 4352(200)	21.47	1.867E-03	.0762	2.326E-03	.0950	2.256E-03	.0921	3.074E-03
T 431(200)	22.53	1.820E-03	.0743	2.247E-03	.0926	2.200E-03	.0898	2.996E-03
S 4110(200)	22.53	1.820E-03	.0743	2.247E-03	.0926	2.200E-03	.0898	2.996E-03
T 432(200)	24.23	1.751E-03	.0715	2.182E-03	.0891	2.117E-03	.0864	2.884E-03
S 4111(200)	24.23	1.751E-03	.0715	2.182E-03	.0891	2.117E-03	.0864	2.884E-03
M 4353(200)	24.23	1.751E-03	.0715	2.182E-03	.0891	2.117E-03	.0864	2.884E-03
T 433(200)	26.26	1.679E-03	.0685	2.090E-03	.0853	2.029E-03	.0828	2.761E-03
S 4112(200)	26.26	1.679E-03	.0685	2.090E-03	.0853	2.029E-03	.0828	2.761E-03
T 434(200)	28.31	1.614E-03	.0658	2.010E-03	.0820	1.951E-03	.0796	2.654E-03
S 4113(200)	28.31	1.614E-03	.0658	2.010E-03	.0820	1.951E-03	.0796	2.654E-03
M 4354(200)	28.31	1.614E-03	.0658	2.010E-03	.0820	1.951E-03	.0796	2.654E-03
T 435(200)	30.33	1.556E-03	.0635	1.939E-03	.0791	1.881E-03	.0768	2.561E-03
S 4114(200)	30.33	1.556E-03	.0635	1.939E-03	.0791	1.881E-03	.0768	2.561E-03
M 4357(200)	30.33	1.556E-03	.0635	1.939E-03	.0791	1.881E-03	.0768	2.561E-03
T 436(200)	32.36	1.505E-03	.0614	1.875E-03	.0765	1.819E-03	.0742	2.475E-03
M 4358(200)	32.36	1.505E-03	.0614	1.875E-03	.0765	1.819E-03	.0742	2.475E-03

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7/10/73

NASA-RI ORBITER TEATING AEDC(ARO-INC.) ARNOLD AFS, TENNESSEE  
 VA289 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL R

GROUP CONFIG MODEL MACH NO P(RPSIA) T(0 DEG R) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREBEND ROLL-MODEL YAW  
 83 6 ORBITER R3 7.95 211.2 1294 30.02 -0.02 -30.00 -180.00 -0.00

T-INF P-INF O-INF V-INF RMN-INF MU-INF RE/FT HREF STREF  
 (DEG R) (PSIA) (PSIA) (FT/SFC) (SLUGS/FT3) (LBS-SEC/FT2) (FT-1) (R= .0175FT) (R= .0175FT)  
 94.9 .023 .997 3794 1.093E-05 7.638E-08 9.499E-05 2.450E-02 4.082E-02

CAPTRA ROLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHOKACK) TRAR(TO) BETA(TO)  
 TOP(IT) 9351  
 SIDF(SI) 8063  
 WOTTCM(R) 7147

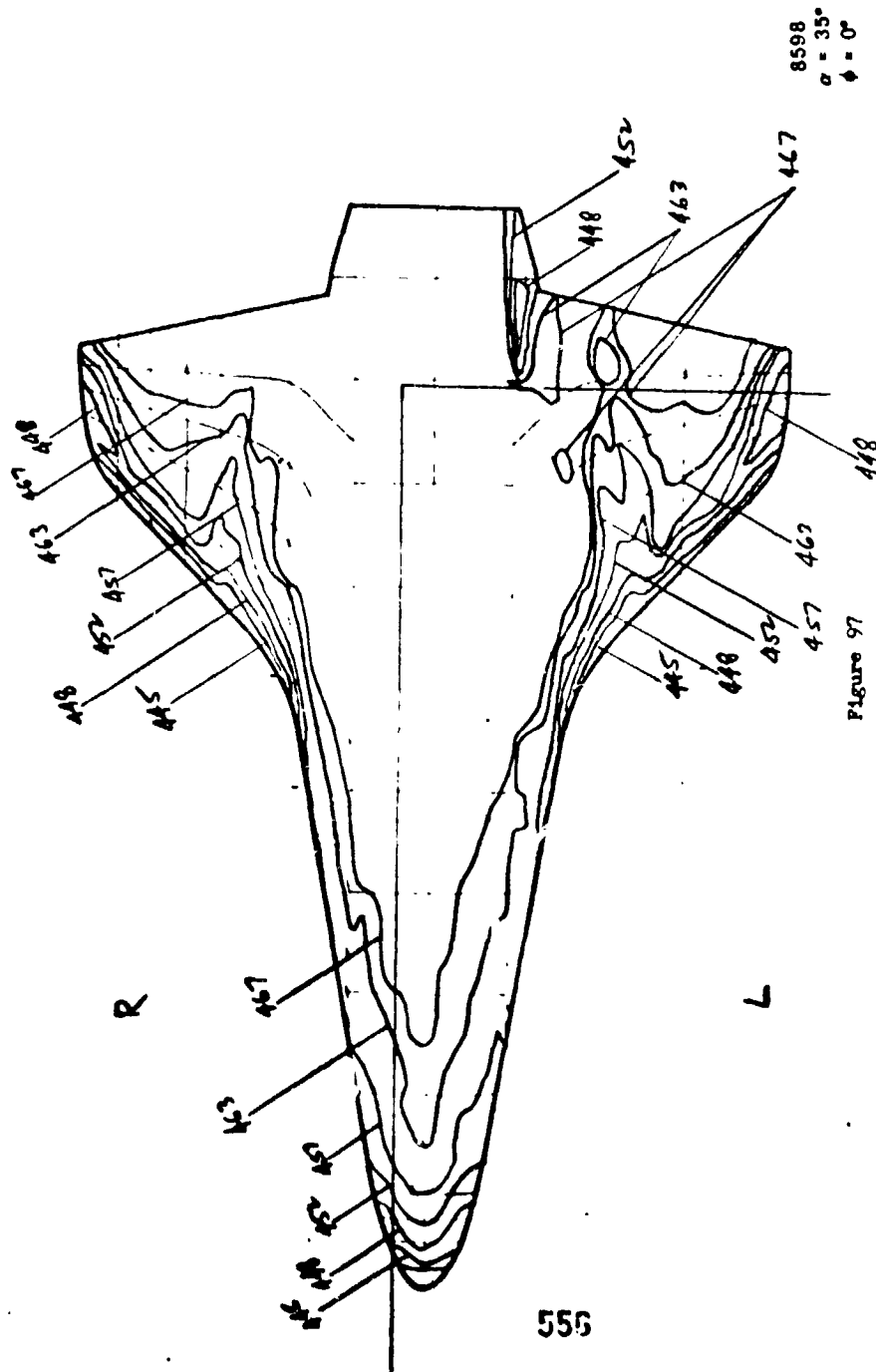
200 .0519 1.592E-01 1.6168E-01

PTC NO	TIME DELTIME	H(TO)	H(TO)/HREF	M(.9TO)	M(.9TO)/HREF	M(.912TO)	M(.912TO)/HREF	ST(TO)
S 4115(200)	32.39	1.504E-03	.0614	1.874E-03	.0765	1.818E-03	.0742	2.474E-03
R 6358(200)	34.39	1.458E-03	.0595	1.817E-03	.0741	1.762E-03	.0719	2.398E-03
T 431(200)	34.41	1.457E-03	.0595	1.816E-03	.0741	1.762E-03	.0719	2.398E-03
S 4116(200)	35.41	1.457E-03	.0595	1.816E-03	.0741	1.762E-03	.0719	2.398E-03
MODEL HAS LEFT CENTERLINE								
T 438(200)	36.44	1.415E-03	.0577	1.763E-03	.0719	1.710E-03	.0698	2.326E-03
S 4117(200)	36.44	1.415E-03	.0577	1.763E-03	.0719	1.710E-03	.0698	2.326E-03
R 6360(200)	36.44	1.415E-03	.0577	1.763E-03	.0719	1.710E-03	.0698	2.326E-03
T 439(200)	36.47	1.376E-03	.0561	1.714E-03	.0699	1.663E-03	.0679	2.263E-03
S 4118(200)	37.24	1.376E-03	.0561	1.714E-03	.0699	1.663E-03	.0679	2.263E-03
M 6361(200)	37.24	1.376E-03	.0561	1.714E-03	.0699	1.663E-03	.0679	2.263E-03
T 440(200)	40.50	1.340E-03	.0546	1.669E-03	.0681	1.619E-03	.0661	2.202E-03
M 6362(200)	40.50	1.340E-03	.0546	1.669E-03	.0681	1.619E-03	.0661	2.202E-03
S 4119(200)	40.52	1.339E-03	.0546	1.669E-03	.0681	1.619E-03	.0660	2.202E-03

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Q351  
GPO4  
س



8598  
 $\sigma = 35^\circ$   
 $\phi = 0^\circ$

Figure 97

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7/19/73

NASA-RI ORBITER HEATING  
 AEDC(ARO, INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL R

VA289

GROUP CONFIG MODEL MACH NO PR(PISA) TO( DEG R) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREBEND ROLL-MODEL YAW  
 RA 4 ORBITER R1 7.95 712.4 1297 35.05 -5.05 -30.00 -180.00 -0.00

T-INF P-INF Q-INF V-INF RHQ-INF MU-INF RE/FT HREF STREF  
 (DEG R) (PSIA) (PSIA) (FT/SEC) (SLUGS/FT<sup>3</sup>) (LB-SEC/FT<sup>2</sup>) (FT-1) (R= .0175FT) (H= .0175FT)  
 95.1 .023 1.002 3799 1.999E-05 7.656E-08 9.819E 05 2.458E-02 4.074E-02

CAMERA ROLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHQXCK) THAR(TO) BETA(TO)

TOP(T) 8351  
 SIDE(S) 8063  
 BOTTOM(B) 7747

PIC NO TIME DELTIME H(TO) H(TO)/HREF H(.9TO) HREF H(.923TO) H(.923TO)/HREF ST(TO)

T 441(250) 1.15 MODEL HAS NOT REACHED CENTERLINE  
 S 4120(250) 1.15 MODEL HAS NOT REACHED CENTERLINE  
 R 6263(250) 1.18 MODEL HAS NOT REACHED CENTERLINE  
 H 6364(250) 2.23 MODEL HAS NOT REACHED CENTERLINE  
 T 442(250) 2.25 MODEL HAS NOT REACHED CENTERLINE  
 S 4121(250) 2.25 MODEL HAS NOT REACHED CENTERLINE

INJECT TIME = 2.30

DATA NOT YET VALID

DATA NOT YET VALID

DATA NOT YET VALID

T	441(250)	1.15	3.09	7.446E-03	.3051	9.484E-03	.1866	8.928E-03	.3639	1.227E-02
S	4120(250)	1.15	3.09	7.446E-03	.3051	9.484E-03	.3846	8.928E-03	.3639	1.227E-02
R	6263(250)	1.18	3.11	7.455E-03	.3037	9.444E-03	.3848	8.928E-03	.3623	1.221E-02
H	6364(250)	2.23	4.14	6.446E-03	.2627	8.167E-03	.3728	7.688E-03	.3133	1.058E-02
T	442(250)	2.25	4.14	6.446E-03	.2627	8.167E-03	.3728	7.688E-03	.3133	1.058E-02
S	4121(250)	2.25	4.16	6.446E-03	.2627	8.167E-03	.3728	7.688E-03	.3133	1.058E-02
R	6264(250)	2.25	5.24	5.746E-03	.2342	7.280E-03	.2967	6.853E-03	.2793	9.415E-03
H	6365(250)	2.25	5.24	5.746E-03	.2342	7.280E-03	.2967	6.853E-03	.2793	9.415E-03
T	443(250)	2.25	5.24	5.746E-03	.2342	7.280E-03	.2967	6.853E-03	.2793	9.415E-03
S	4122(250)	2.25	5.24	5.746E-03	.2342	7.280E-03	.2967	6.853E-03	.2793	9.415E-03
R	6265(250)	2.25	6.32	5.234E-03	.2133	6.631E-03	.2703	6.242E-03	.2544	8.579E-03
H	6366(250)	2.25	6.32	5.234E-03	.2133	6.631E-03	.2703	6.242E-03	.2544	8.579E-03
T	444(250)	2.25	6.32	5.234E-03	.2133	6.631E-03	.2703	6.242E-03	.2544	8.579E-03
S	4123(250)	2.25	6.32	5.234E-03	.2133	6.631E-03	.2703	6.242E-03	.2544	8.579E-03
R	6266(250)	2.25	7.39	4.848E-03	.1972	6.129E-03	.2498	5.770E-03	.2352	7.931E-03
H	6367(250)	2.25	7.39	4.848E-03	.1972	6.129E-03	.2498	5.770E-03	.2352	7.931E-03
T	445(250)	2.25	8.44	4.526E-03	.1845	5.735E-03	.2318	5.399E-03	.2201	7.420E-03

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7/10/73

AEDCI(ARO, INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL R

NASA-RI ORBITER HEATING

VA2R9

GROUP CONFID MODEL MACH NO PO(PSIA) TO(DEG R) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREBEND ROLL-MODEL YAW  
 R4 4 ORBITER R1 7.95 211.6 1297 35.05 -5.05 -30.00 -180.00 -0.00

T-INF P-INF Q-INF V-INF MU-INF RHO-INF MU-INF RE/FT MREF STREF  
 (DEG R) (PSIA) (PSIA) (FT/SEC) (SLUGS/FT3) (LB-SEC/FT2) (FI-1) (R= .0175FT) (M= .0175FT)

95.1 .023 .999 3799 1.992E-05 7.656E-08 9.882E 05 2.453E-02 4.084E-02

CAMERA ROLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHOXCKX) TRAR(TO) BETAT(TO)  
 TOP(T) 8251  
 SIDE(S) 8063  
 BOTTOM(B) 7747

2.265E-01 2.4585E-01

78

.0535

045

PIC NO	TIME DELTIME	H(TO)	H(TO)/HREF	H(-910)	H(-910)/HREF	H(-923TO)	H(-923TO)/HREF	ST(TO)
T 449(250)	9.76	8.47	4.520F-03	5.726E-03	.2135	5.391E-03	.2198	7.416E-03
S 412(250)	9.76	8.47	4.520F-03	5.726E-03	.2135	5.391E-03	.2198	7.416E-03
T 450(250)	10.61	9.52	4.263F-03	5.401E-03	.2203	5.084E-03	.2073	6.994E-03
M 6372(250)	10.81	9.52	4.263F-03	5.401E-03	.2203	5.084E-03	.2073	6.994E-03
S 4129(250)	10.84	9.54	4.263F-03	5.394E-03	.2203	5.078E-03	.2071	6.986E-03
T 451(250)	11.89	10.60	4.041F-03	5.119E-03	.2088	4.819E-03	.1966	6.633E-03
S 4130(250)	11.89	10.60	4.041F-03	5.119E-03	.2088	4.819E-03	.1966	6.633E-03
M 6373(250)	11.89	10.60	4.041F-03	5.119E-03	.2088	4.819E-03	.1966	6.633E-03
T 452(250)	12.56	11.67	3.850F-03	4.874E-03	.1990	4.592E-03	.1873	6.323E-03
S 4131(250)	12.56	11.67	3.850F-03	4.874E-03	.1990	4.592E-03	.1873	6.323E-03
M 6374(250)	12.56	11.67	3.850F-03	4.874E-03	.1990	4.592E-03	.1873	6.323E-03
T 453(250)	14.04	12.75	3.644F-03	4.667E-03	.1903	4.394E-03	.1792	6.044E-03
S 4132(250)	14.04	12.75	3.644F-03	4.667E-03	.1903	4.394E-03	.1792	6.044E-03
M 6375(250)	14.04	12.75	3.644F-03	4.667E-03	.1903	4.394E-03	.1792	6.044E-03
T 454(250)	15.09	13.82	3.541E-03	4.484E-03	.1829	4.223E-03	.1722	5.810E-03
S 4133(250)	15.12	13.82	3.541E-03	4.484E-03	.1829	4.223E-03	.1722	5.810E-03
M 6376(250)	15.12	13.82	3.541E-03	4.484E-03	.1829	4.223E-03	.1722	5.810E-03
T 455(250)	16.17	14.88	3.410F-03	4.321E-03	.1742	4.067E-03	.1659	5.599E-03
S 4134(250)	16.17	14.88	3.410F-03	4.321E-03	.1742	4.067E-03	.1659	5.599E-03
M 6377(250)	16.17	14.88	3.410F-03	4.321E-03	.1742	4.067E-03	.1659	5.599E-03
T 456(250)	17.24	15.95	3.243F-03	4.172E-03	.1702	3.928E-03	.1602	5.406E-03
S 4135(250)	17.24	15.95	3.243F-03	4.172E-03	.1702	3.928E-03	.1602	5.406E-03
M 6378(250)	17.24	15.95	3.243F-03	4.172E-03	.1702	3.928E-03	.1602	5.406E-03
T 457(250)	18.22	17.03	3.147E-03	4.038E-03	.1647	3.802E-03	.1551	5.233E-03
S 4136(250)	18.22	17.03	3.147E-03	4.038E-03	.1647	3.802E-03	.1551	5.233E-03
M 6379(250)	18.22	17.03	3.147E-03	4.038E-03	.1647	3.802E-03	.1551	5.233E-03

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7/10/73

NASA-RT WRITER PEATING AEDC(AO, INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL A

VAZ09

GROUP CONFID MODEL MACH NO P0(PSTA) T0(DEG R) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREREMO ROLL-MODEL YAW  
 P 4 0REITER R1 7.95 211.3 1297 35.05 -5.05 -30.00 -180.00 -0.00

T-INF P-INF Q-INF V-INF MU-INF RHO-INF RF/FT MRFF STREF  
 (DEG R) (PSIA) (PSIA) (FT/SEC) (SLUGS/FT3) (LB-SEC/FT2) (FT-1) (R= .0175FT) (R= .0175FT)  
 95.1 .023 .997 3790 1.985E-05 7.657E-08 9.467E 05 2.452E-02 4.087E-02

CAPRA ROLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHOXCK) TBAR(10) BETA(10)

TOP(T) 8351  
 SIDE(S) 8663  
 BOTTOM(B) 7747

2.265E-01 2.4585F-01

.0535

PIC NO	TIME RELTIME	M(10)	M(10)/HREF	M(10)	M(10)/HREF	M(10)	M(10)/HREF	M(10)	M(10)/HREF	ST(10)
M 4780(250)	19.37	3.093E-03	.1261	3.919E-03	.1598	3.689E-03	.1505	3.689E-03	.1505	5.076E-03
T 458(250)	19.40	3.093E-03	.1261	3.919E-03	.1598	3.689E-03	.1505	3.689E-03	.1505	5.076E-03
S 413(250)	19.40	3.093E-03	.1261	3.919E-03	.1598	3.689E-03	.1505	3.689E-03	.1505	5.076E-03
T 459(250)	20.45	3.005E-03	.1226	3.807E-03	.1553	3.584E-03	.1462	3.584E-03	.1462	4.935E-03
M 4781(250)	20.45	3.005E-03	.1226	3.807E-03	.1553	3.584E-03	.1462	3.584E-03	.1462	4.935E-03
S 4134(250)	20.47	3.003E-03	.1225	3.805E-03	.1552	3.582E-03	.1461	3.582E-03	.1461	4.930E-03
T 460(250)	21.52	2.924E-03	.1193	3.705E-03	.1512	3.488E-03	.1423	3.488E-03	.1423	4.805E-03
S 4139(250)	21.52	2.924E-03	.1193	3.705E-03	.1512	3.488E-03	.1423	3.488E-03	.1423	4.805E-03
M 4782(250)	21.52	2.924E-03	.1193	3.705E-03	.1512	3.488E-03	.1423	3.488E-03	.1423	4.805E-03
T 461(250)	22.60	2.849E-03	.1163	3.619E-03	.1473	3.398E-03	.1387	3.398E-03	.1387	4.682E-03
S 4140(250)	22.60	2.849E-03	.1163	3.619E-03	.1473	3.398E-03	.1387	3.398E-03	.1387	4.682E-03
M 4783(250)	22.60	2.849E-03	.1163	3.619E-03	.1473	3.398E-03	.1387	3.398E-03	.1387	4.682E-03
T 462(250)	24.35	2.739E-03	.1119	3.470E-03	.1416	3.267E-03	.1333	3.267E-03	.1333	4.501E-03
S 4141(250)	24.35	2.739E-03	.1119	3.470E-03	.1416	3.267E-03	.1333	3.267E-03	.1333	4.501E-03
M 4784(250)	24.35	2.739E-03	.1119	3.470E-03	.1416	3.267E-03	.1333	3.267E-03	.1333	4.501E-03
T 463(250)	26.38	2.626E-03	.1072	3.327E-03	.1358	3.132E-03	.1278	3.132E-03	.1278	4.315E-03
S 4145(250)	26.38	2.626E-03	.1072	3.327E-03	.1358	3.132E-03	.1278	3.132E-03	.1278	4.315E-03
M 4785(250)	26.41	2.626E-03	.1071	3.325E-03	.1357	3.130E-03	.1277	3.130E-03	.1277	4.313E-03
T 464(250)	28.41	2.526E-03	.1031	3.200E-03	.1306	3.013E-03	.1229	3.013E-03	.1229	4.199E-03
S 4143(250)	28.43	2.525E-03	.1031	3.199E-03	.1306	3.011E-03	.1229	3.011E-03	.1229	4.190E-03
M 4786(250)	28.43	2.525E-03	.1031	3.199E-03	.1306	3.011E-03	.1229	3.011E-03	.1229	4.190E-03
T 465(250)	30.46	2.435E-03	.0994	3.084E-03	.1259	2.905E-03	.1186	2.905E-03	.1186	4.004E-03
S 4144(250)	30.46	2.435E-03	.0994	3.084E-03	.1259	2.905E-03	.1186	2.905E-03	.1186	4.004E-03
M 4787(250)	30.46	2.435E-03	.0994	3.084E-03	.1259	2.905E-03	.1186	2.905E-03	.1186	4.004E-03
T 466(250)	32.49	2.355E-03	.0961	2.984E-03	.1218	2.809E-03	.1146	2.809E-03	.1146	3.872E-03
S 4145(250)	32.49	2.355E-03	.0961	2.984E-03	.1218	2.809E-03	.1146	2.809E-03	.1146	3.872E-03
M 4788(250)	32.49	2.355E-03	.0961	2.984E-03	.1218	2.809E-03	.1146	2.809E-03	.1146	3.872E-03

3-5

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7/18/73

PROCTER-INGEN-AMCTU-SP3-TENPSSCE  
VON KARMAN GAS DYNAMICS FACILITY  
50 INCH HYPERSONIC TUNNEL R

02289

GROUP COMP16 MODEL MACH NO PO(PISA) TO(LEG R) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREBEND ROLL-MODEL YAW

PE 022177-01 7.95 211.0 1297 35.05 -5.05 -38.00 -180.00 -0.00

Y-INF P-INF O-INF V-INF RHO-INF MU-INF HE/FT MREF SREF  
(DEG R) (PSIA) (FT/SFC) (SLUGS/FT3) (LR-SEC/FT2) (FT-1) (R= .0175FT) (R= .0175FT)

95.1 .023 .096 .3790 1.086E-05 7.657E-08 9.853E 05 2.450E-02 4.090E-02

CAMERA ROLL-MO POINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHOCENT) T8ARTTOT 8ETATTOT

TOP(IT) 8351 250 78 .0535 2.265E-01 2.454E-01

SIDE(S) 8663

MOTION(B) 7747

PTC NO	TIME DELTIME	HTTOT/MREF	HT-9TOT/MREF	HT-923TOT/MREF	HT-923TOT/MREF	ST(TOT)
T 48712501	34.51	33.22	2.202E-03	2.891E-03	.1180	2.722E-03 .1111 3.753E-03
M 639912501	34.51	33.22	2.202E-03	2.891E-03	.1180	2.722E-03 .1111 3.753E-03
S 414612501	34.54	31.25	2.201E-03	2.890E-03	.1180	2.721E-03 .1111 3.750E-03
MODEL HAS LEFT CENTERLINE						
M 439012501	36.54	35.25	2.215E-03	2.897E-03	.1146	2.642E-03 .1079 3.642E-03
T 49012501	36.57	35.27	2.215E-03	2.896E-03	.1146	2.641E-03 .1079 3.644E-03
S 414712501	36.59	37.30	2.215E-03	2.896E-03	.1146	2.641E-03 .1079 3.644E-03
T 46912501	36.59	37.30	2.154E-03	2.728E-03	.1114	2.569E-03 .1049 3.544E-03
S 414812501	38.59	37.30	2.154E-03	2.728E-03	.1114	2.569E-03 .1049 3.544E-03
M 639112501	38.59	37.30	2.154E-03	2.728E-03	.1114	2.569E-03 .1049 3.544E-03
T 47012501	40.62	39.33	2.097E-03	2.657E-03	.1085	2.501E-03 .1022 3.453E-03
S 439912501	40.62	39.33	2.097E-03	2.657E-03	.1085	2.501E-03 .1022 3.453E-03
M 639212501	40.62	39.33	2.097E-03	2.657E-03	.1085	2.501E-03 .1022 3.453E-03

8351  
6P85  
CWC

8801  
 $\alpha = 45^\circ$   
 $\phi = 0^\circ$

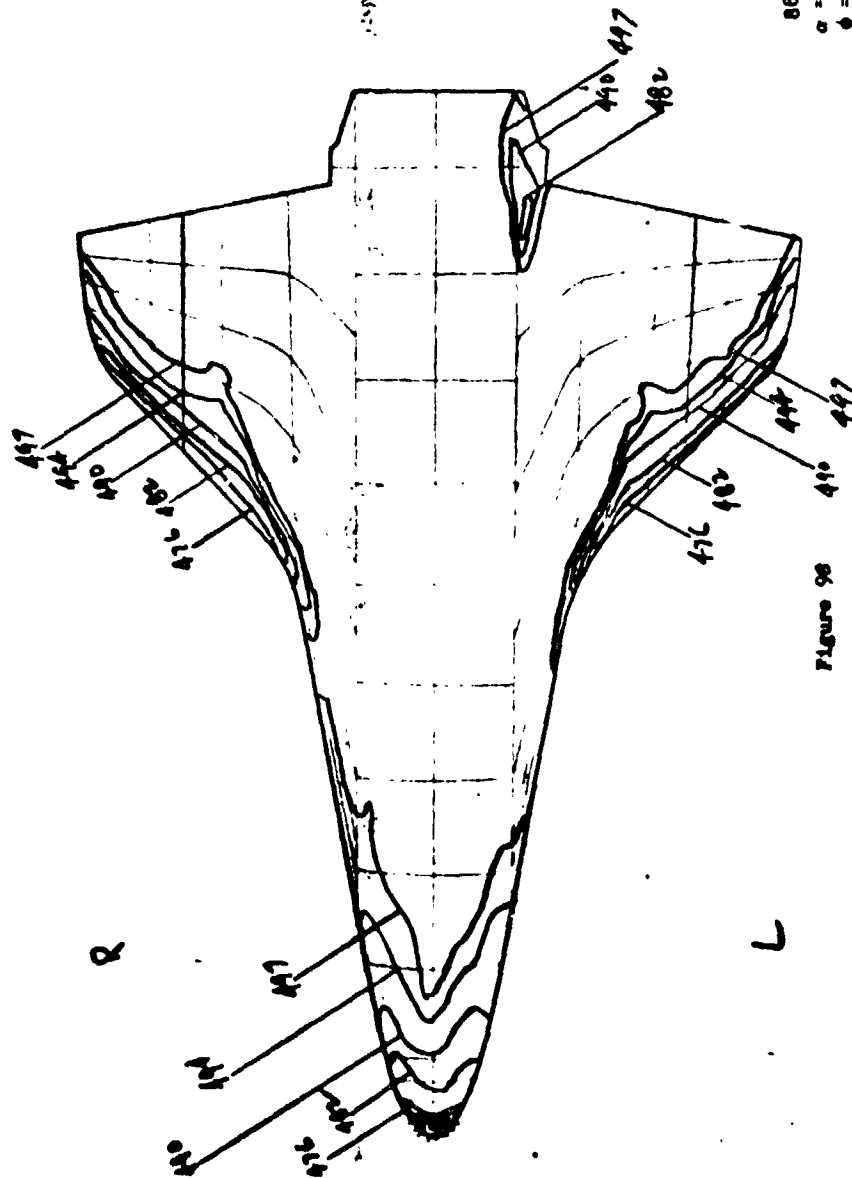


Figure 98

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7/10/73

NASA-RI ORBITER HEATING

AEDC(ARO,INC.) ARNOLD AFB, TENNESSEE  
VON KARMAN GAS DYNAMICS FACILITY  
50 INCH HYPERSONIC TUNNEL N

W2209

GROUP CMMPT6 MODEL MACH NO POI(PIA) TO(DEC R) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREBEND ROLL-MODEL YAW  
85 2 ORBITER S 7.95 209.3 1298 44.84 -14.04 -30.00 -180.00 -0.00  
T-INF P-INF O-INF V-INF MU-INF RE/FT MREF SIREF  
(OFG R) (PSIA) (PSIA) (FT/SFC) (SLUGS/FT3) (LR-SEC/FT2) (FT-1) (R= .0175FT) (R= .0175FT)  
95.2 .022 .998 .998 3800 7.862E-05 9.763E-05 2.110E-02 4.108E-02  
CAMERA ROLL NO PAINT TEMP (DFG F) INITIAL TEMP (OEG F) SQUARE ROOT (RMXCAK) TBAR(TO) BETA(TO)  
TOP(TI) 8351  
SIDE(S) 8063  
WOTTCM(B) 7747 .0544 0

PIC NO TIME DELTME M(TOI) M(TOI)/MREF M(.910) M(.910)/MREF M(.944TO) M(.944TO)/MREF ST(TOI)  
T 471(100) 1.15 MODEL HAS NOT REACHED CENTERLINE  
S 4150(100) 1.15 MODEL HAS NOT REACHED CENTERLINE  
M 6393(100) 1.15 MODEL HAS NOT REACHED CENTERLINE  
T 472(100) 2.23 MODEL HAS NOT REACHED CENTERLINE  
S 4151(100) 2.23 MODEL HAS NOT REACHED CENTERLINE  
M 6394(100) 2.23 MODEL HAS NOT REACHED CENTERLINE  
INJECT TIME = 2.28  
T 473(100) 3.20 DATA NOT YET VALID  
S 4152(100) 3.20 DATA NOT YET VALID  
M 6395(100) 3.20 DATA NOT YET VALID

349

T	474(100)	4.26	3.04	1.049E-02	.4337	1.371E-02	.8614	1.212E-02	.4964	1.749E-02
S	4153(100)	4.26	3.04	1.055E-02	.4323	1.365E-02	.8505	1.207E-02	.4947	1.745E-02
T	475(100)	4.28	3.14	1.055E-02	.4323	1.365E-02	.8505	1.207E-02	.4947	1.745E-02
S	4154(100)	5.43	4.16	9.114E-03	.3735	1.180E-02	.4934	1.043E-02	.4274	1.507E-02
T	476(100)	5.43	4.16	9.114E-03	.3735	1.180E-02	.4934	1.043E-02	.4274	1.507E-02
S	4155(100)	6.51	5.23	8.122E-03	.3329	1.051E-02	.4301	9.294E-03	.3410	1.344E-02
T	477(100)	6.51	5.23	8.122E-03	.3329	1.051E-02	.4301	9.294E-03	.3410	1.344E-02
S	4156(100)	7.58	6.31	7.306E-03	.3031	9.573E-03	.3923	8.465E-03	.3469	1.223E-02
T	478(100)	7.58	6.31	7.306E-03	.3031	9.573E-03	.3923	8.465E-03	.3469	1.223E-02
S	4157(100)	8.63	7.34	6.846E-03	.2405	8.463E-03	.3431	7.837E-03	.3211	1.132E-02
T	479(100)	8.63	7.34	6.846E-03	.2405	8.463E-03	.3431	7.837E-03	.3211	1.132E-02
S	4158(100)	9.71	8.43	6.346E-03	.2621	8.278E-03	.3393	7.320E-03	.3000	1.058E-02
T	480(100)	9.71	8.43	6.346E-03	.2621	8.278E-03	.3393	7.320E-03	.3000	1.058E-02

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7/10/77

NASA-RI CAMITER PEATING AEDC(ARO, INC.) ARNOLD AFS, TENNESSEE  
VON KARMAN GAS DYNAMICS FACILITY  
50 INCH HYPERSONIC TUNNEL R

GROUP COMP16 MODEL MACH NO PO:PSIA IO(DEC R) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREBEND ROLL-MODEL YAW  
R5 2 GREITER S 7.95 209.2 1298 44.8 -14.04 -30.00 -180.00 -0.00  
T-1AF P-1AF Q-1AF V-1AF RNO-1AF MU-1AF RF/FT MREF SINEF  
(DEG R) (PSIA) (PSIA) (FT/SEC) (SLUGS/FT<sup>4</sup>) (LW-SEC/FT<sup>4</sup>) (FT-1) (R= .0175FT) (R= .0175FT)  
90.2 .022 .007 3000 7.882E-05 9.759E-05 2.440E-02 8.100E-02

CAMERA ROLL NO PAINT IFMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHO/CAK) TBAR(10) BETA(10)  
TOP(1) 8351 77  
SIDE(1) 8063  
BOTTOM(1) 7747 380 .0544 2.930E-01 3.4141E-01

PIC NO	TIME DELT/SEC	M(10)	M(10)/MREF	M(.910)	M(.810)/MREF	M(.9440)	M(.9440)/MREF	ST(10)
S 4150(100)	9.74	6.346E-03	.2617	0.266E-03	.3387	7.309E-03	.2005	1.050E-02
T 4801(100)	10.79	6.023E-03	.2404	7.796E-03	.3194	6.893E-03	.2425	9.950E-03
S 4151(100)	10.79	4.323E-03	.2468	7.796E-03	.3194	6.893E-03	.2425	9.950E-03
M 4002(100)	10.79	4.023E-03	.2404	7.796E-03	.3194	6.893E-03	.2425	9.950E-03
T 4803(100)	11.84	5.715E-03	.2339	7.399E-03	.3031	6.541E-03	.2680	9.450E-03
T 4801(100)	11.84	5.709E-03	.2339	7.399E-03	.3031	6.541E-03	.2680	9.450E-03
S 4160(100)	11.84	5.709E-03	.2339	7.399E-03	.3031	6.541E-03	.2680	9.450E-03
T 4821(100)	12.91	5.445E-03	.2231	7.047E-03	.2888	6.231E-03	.2553	9.002E-03
S 4161(100)	12.91	5.445E-03	.2231	7.047E-03	.2888	6.231E-03	.2553	9.002E-03
M 4004(100)	12.91	5.445E-03	.2231	7.047E-03	.2888	6.231E-03	.2553	9.002E-03
T 4804(100)	13.59	5.209E-03	.2135	6.742E-03	.2763	5.962E-03	.2444	8.616E-03
S 4162(100)	13.59	5.209E-03	.2135	6.742E-03	.2763	5.962E-03	.2444	8.616E-03
M 4005(100)	13.59	5.209E-03	.2135	6.742E-03	.2763	5.962E-03	.2444	8.616E-03
T 4806(100)	15.04	4.906E-03	.2052	6.480E-03	.2656	5.720E-03	.2348	8.280E-03
M 4006(100)	15.04	4.906E-03	.2052	6.480E-03	.2656	5.720E-03	.2348	8.280E-03
S 4163(100)	15.07	4.802E-03	.2050	6.474E-03	.2653	5.720E-03	.2348	8.280E-03
T 4805(100)	16.12	4.821E-03	.1976	6.240E-03	.2557	5.518E-03	.2261	7.971E-03
S 4164(100)	16.12	4.821E-03	.1976	6.240E-03	.2557	5.518E-03	.2261	7.971E-03
M 4007(100)	16.12	4.821E-03	.1976	6.240E-03	.2557	5.518E-03	.2261	7.971E-03
T 4808(100)	17.17	4.650E-03	.1910	6.030E-03	.2472	5.332E-03	.2184	7.701E-03
S 4165(100)	17.19	4.650E-03	.1908	6.025E-03	.2470	5.328E-03	.2184	7.701E-03
M 4008(100)	17.19	4.650E-03	.1908	6.025E-03	.2470	5.328E-03	.2184	7.701E-03
T 4809(100)	18.25	4.509E-03	.1848	5.830E-03	.2391	5.160E-03	.2115	7.411E-03
S 4166(100)	18.25	4.509E-03	.1848	5.830E-03	.2391	5.160E-03	.2115	7.411E-03
M 4009(100)	18.25	4.509E-03	.1848	5.830E-03	.2391	5.160E-03	.2115	7.411E-03
T 4810(100)	18.27	4.500E-03	.1847	5.832E-03	.2390	5.156E-03	.2114	7.407E-03

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ARDCIAHO-IAC.1 ANNOLU AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL R

NASA-RI ORBITER PEATIME

VAPRQ

GROUP CONFID MODEL MACH NO POISIA TOIDEG R1 ALPHA-MODEL ALPHA-SECTOR ALPHA-PREBEND ROLL-MODEL YAW  
 AS 2 ORBITER S 7.95 209.2 1298 44.84 -14.84 -30.00 -100.00 -0.00

T-1AF P-1MF Q-1MF R-1MF MU-1MF DE-1F HREF STREF  
 IDG R (PSIA) (FT/SEC) (LARS/FT2) (FT-1) (R= .0175FT) (R= .0175FT)

95.7 1422 .987 1900 1.661E-04 7.661E-04 8.761E-05 2.440E-02 4.109E-02

CAMERA ROLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHO/CK) THRUST (T) DETAIL (T)

TOP (T) 8351 77 0.0544 2.930E-01 3.414E-01

WOT (T) 8863 7747

PIC NO	TIME	MELTIME	MITO	M(YO)/MREF	M(OTO)	M(OTO)/MREF	M(OTO)/MREF	M(OTO)/MREF	ST(TO)
T 4081(100)	19.22	18.04	4.372E-03	.1793	5.659E-03	.2320	5.004E-03	.2052	7.235E-03
S 4167(100)	19.32	18.04	4.372E-03	.1793	5.659E-03	.2320	5.004E-03	.2052	7.235E-03
M 4101(100)	19.32	18.04	4.372E-03	.1793	5.659E-03	.2320	5.004E-03	.2052	7.235E-03
T 4891(100)	20.27	19.09	4.250E-03	.1747	5.501E-03	.2245	4.864E-03	.1994	7.030E-03
S 4164(100)	20.40	19.12	4.247E-03	.1741	5.498E-03	.2253	4.861E-03	.1992	7.023E-03
M 4162(100)	20.40	19.12	4.247E-03	.1741	5.498E-03	.2253	4.861E-03	.1992	7.023E-03
T 4901(100)	21.45	20.17	4.135E-03	.1645	5.349E-03	.2192	4.730E-03	.1939	6.837E-03
S 4169(100)	21.47	20.24	4.133E-03	.1644	5.349E-03	.2192	4.730E-03	.1939	6.836E-03
M 4161(100)	21.47	20.24	4.133E-03	.1644	5.349E-03	.2192	4.730E-03	.1939	6.836E-03
T 4911(100)	22.23	21.29	4.079E-03	.1652	5.215E-03	.2138	4.611E-03	.1891	6.688E-03
S 4173(100)	22.53	21.26	4.079E-03	.1652	5.215E-03	.2138	4.611E-03	.1891	6.688E-03
M 4170(100)	22.55	21.27	4.079E-03	.1651	5.215E-03	.2136	4.609E-03	.1889	6.681E-03
T 4921(100)	24.05	22.77	3.892E-03	.1595	5.037E-03	.2045	4.454E-03	.1826	6.438E-03
S 4174(100)	24.05	22.77	3.892E-03	.1595	5.037E-03	.2045	4.454E-03	.1826	6.438E-03
M 4171(100)	24.05	22.77	3.892E-03	.1594	5.036E-03	.2043	4.452E-03	.1825	6.434E-03
T 4931(100)	26.08	24.88	3.729E-03	.1528	4.827E-03	.1978	4.268E-03	.1749	6.166E-03
S 4172(100)	26.11	24.87	3.727E-03	.1528	4.826E-03	.1977	4.266E-03	.1749	6.166E-03
M 4173(100)	26.13	24.86	3.727E-03	.1528	4.826E-03	.1977	4.266E-03	.1749	6.166E-03
T 4941(100)	28.13	26.85	3.584E-03	.1469	4.639E-03	.1901	4.102E-03	.1681	5.926E-03
S 4173(100)	28.13	26.86	3.584E-03	.1469	4.639E-03	.1901	4.102E-03	.1681	5.926E-03
M 4161(100)	28.13	26.85	3.584E-03	.1469	4.639E-03	.1901	4.102E-03	.1681	5.926E-03
T 4951(100)	30.16	28.88	3.456E-03	.1416	4.473E-03	.1833	3.955E-03	.1621	5.717E-03
S 4174(100)	30.16	28.88	3.456E-03	.1416	4.473E-03	.1833	3.955E-03	.1621	5.717E-03
M 4171(100)	30.16	28.88	3.456E-03	.1414	4.473E-03	.1832	3.955E-03	.1621	5.717E-03
T 4961(100)	32.19	30.91	3.341E-03	.1369	4.324E-03	.1772	3.823E-03	.1567	5.526E-03
M 4161(100)	32.19	30.91	3.341E-03	.1369	4.324E-03	.1772	3.823E-03	.1567	5.526E-03

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NASA-RI ORBITER HEATING  
 VA249  
 AEDCI(ARINC) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 98 INCH HYPERSONIC TUNNEL R

GROUP COMPTE MODEL MACH NO PO(PSIA) TO(DEC R) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREEMO ROLL-MODEL YAW  
 MS P ORBITER S 7.95 209.2 1298 44.84 -16.86 -30.00 -100.00 -0.00

T-1AF P-1NF Q-1NF RMO-1NF MU-1NF RE/FT MREF STREF  
 (DEC R) (PSIA) (PSIA) (SLUGS/FT) (LB-SEC/FT) (FT-1) (R-0175E1) (R-0175E1)  
 94.2 0.22 0.47 3000 1.948E-05 7.661E-04 5.760E 05 2.440E-02 4.109E-02

CAMERA MOLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RMORCAK) TRAR(10) BETA(10)  
 TOP(T) 8351  
 SIG(T) 8063  
 MOLL(10) 7747

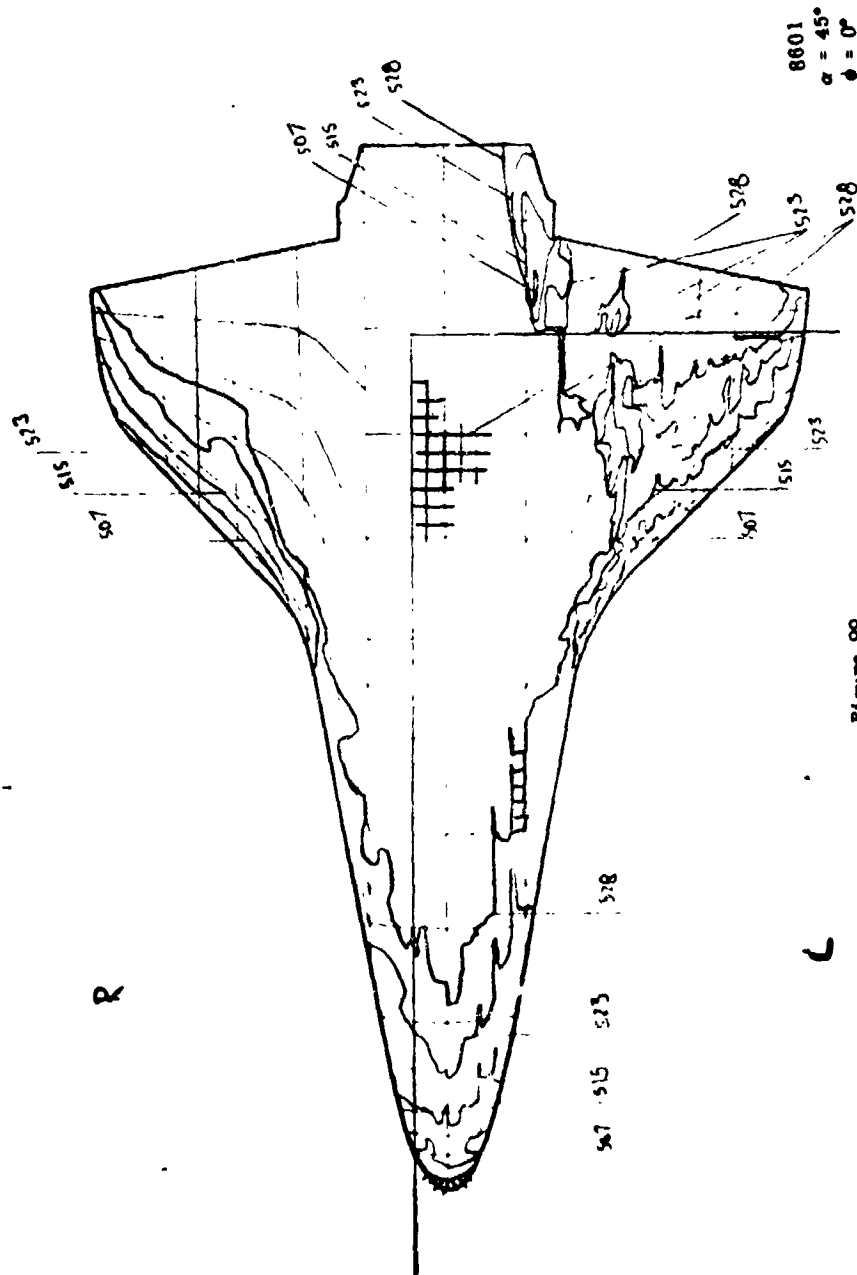
0544 2.930E-01 3.4141E-01

PIC NO	TIME DELTIME	M(10)	M(10)/MREF	M(10)	M(10)/MREF	M(10)	M(10)/MREF	ST(10)
S 4175(100)	32.21 20.03	3.339E-03	.1369	4.322E-03	.1771	3.822E-03	.1566	5.521E-03
T 497(100)	34.21 32.04	3.236E-03	.1326	4.189E-03	.1717	3.704E-03	.1518	5.353E-03
M 4419(100)	34.21 32.04	3.236E-03	.1326	4.189E-03	.1717	3.704E-03	.1518	5.353E-03
S 4176(100)	36.24 32.04	3.235E-03	.1326	4.147E-03	.1717	3.702E-03	.1518	5.354E-03
T 498(100)	36.27 36.09	3.140E-03	.1287	4.064E-03	.1666	3.593E-03	.1473	5.194E-03
S 4177(100)	36.27 36.09	3.140E-03	.1287	4.064E-03	.1666	3.593E-03	.1473	5.194E-03
M 4420(100)	36.27 36.09	3.140E-03	.1287	4.064E-03	.1666	3.593E-03	.1473	5.194E-03
MODEL WAS LEFT CENTERLINE								
T 499(100)	38.20 37.02	3.053E-03	.1251	3.951E-03	.1619	3.494E-03	.1432	5.050E-03
S 4178(100)	38.20 37.02	3.053E-03	.1251	3.951E-03	.1619	3.494E-03	.1432	5.050E-03
M 4421(100)	38.20 37.02	3.053E-03	.1251	3.951E-03	.1619	3.494E-03	.1432	5.050E-03
T 500(100)	40.22 34.04	2.972E-03	.1219	3.847E-03	.1577	3.402E-03	.1395	4.919E-03
S 4179(100)	40.22 34.04	2.972E-03	.1219	3.847E-03	.1577	3.402E-03	.1395	4.919E-03
M 4422(100)	40.22 34.04	2.972E-03	.1219	3.847E-03	.1577	3.402E-03	.1395	4.919E-03

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565

Group 86  
B063  
NO



8801  
 $\alpha = 45^\circ$   
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Figure 99

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7/10/73

NASA-RI ORBITER PEATING AEDC(ARL) INC.1 ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL 8  
 VA249

GROUP	CONFIG	MODEL	MACH NO	PO(P51A)	TO(DEC R)	ALPHA-MODEL	ALPHA-SECTOR	ALPHA-PREBEND	ROLL-MODEL	YAW
R6	6	ORBITER R3	7.95	207.5	1299	44.53	-14.53	-30.00	-100.00	-0.00
T-1NF	P-1NF	Q-1NF	V-1NF	RNO-1NF	MU-1NF	RE/FT	MREF	STREF		
(DEC R)	(P51A)	(P51A)	(FT/SEC)	(SLUGS/FT3)	(LR-SEC/FT2)	(F1-1)	(R6-0175F1)	(R6-0175F1)		
95.2	-0.22	0.979	3801	1.051E-05	7.66E-08	9.47E 05	2.430E-02	4.127E-02		
CAMERA	ROLL NO	PAINT TEMP (DEG F)	INITIAL TEMP (DEG F)	SQUARE ROOT (HHOACAK)	TRAR(TO)	3ETA(TO)				
TOP(T)	8351									
SIDE(S)	8063									
MOTICM(B)	7747									

PIC NO	TIME DELTME	H(TO)	H(TO)/HREF	M(-910)	M(-910)/HREF	M(-944TO)	M(-944TO)/HREF	ST(TO)
M 6423(100)	1.15	MODEL HAS NOT REACHED CENTERLINE						
T 501(100)	1.18	MODEL HAS NOT REACHED CENTERLINE						
S 4180(100)	1.18	MODEL HAS NOT REACHED CENTERLINE						
T 502(100)	2.25	MODEL HAS NOT REACHED CENTERLINE						
S 4181(100)	2.25	MODEL HAS NOT REACHED CENTERLINE						
M 6424(100)	2.25	MODEL HAS NOT REACHED CENTERLINE						
INJECT TIME =	2.28							
M 6425(100)	3.20	DATA NOT YET VALID						
T 503(100)	3.23	DATA NOT YET VALID						
S 4182(100)	3.23	DATA NOT YET VALID						
T 504(100)	4.28	1.022E-02	.4204	1.323E-02	.5441	1.172E-02	.4820	1.703E-02
M 6426(100)	4.28	1.022E-02	.4204	1.323E-02	.5441	1.172E-02	.4820	1.703E-02
S 4183(100)	4.41	1.018E-02	.4187	1.318E-02	.5420	1.167E-02	.4801	1.696E-02
T 505(100)	5.46	1.008E-03	.3621	1.140E-02	.4487	1.010E-02	.4152	1.466E-02
M 6427(100)	5.46	1.008E-03	.3621	1.140E-02	.4487	1.010E-02	.4152	1.466E-02
T 506(100)	6.53	1.022E-02	.4204	1.323E-02	.5441	1.172E-02	.4820	1.703E-02
S 4184(100)	6.53	1.022E-02	.4204	1.323E-02	.5441	1.172E-02	.4820	1.703E-02
M 6428(100)	6.53	1.022E-02	.4204	1.323E-02	.5441	1.172E-02	.4820	1.703E-02
T 507(100)	7.61	1.022E-02	.4204	1.323E-02	.5441	1.172E-02	.4820	1.703E-02
S 4185(100)	7.61	1.022E-02	.4204	1.323E-02	.5441	1.172E-02	.4820	1.703E-02
M 6429(100)	7.61	1.022E-02	.4204	1.323E-02	.5441	1.172E-02	.4820	1.703E-02
T 508(100)	8.68	1.022E-02	.4204	1.323E-02	.5441	1.172E-02	.4820	1.703E-02
S 4186(100)	8.68	1.022E-02	.4204	1.323E-02	.5441	1.172E-02	.4820	1.703E-02
M 6430(100)	8.68	1.022E-02	.4204	1.323E-02	.5441	1.172E-02	.4820	1.703E-02
T 509(100)	9.74	1.022E-02	.4204	1.323E-02	.5441	1.172E-02	.4820	1.703E-02
S 4187(100)	9.74	1.022E-02	.4204	1.323E-02	.5441	1.172E-02	.4820	1.703E-02
M 6431(100)	9.74	1.022E-02	.4204	1.323E-02	.5441	1.172E-02	.4820	1.703E-02

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33653 TENNESSEE  
VON KAMMAN GAS DYNAMICS FACILITY  
50 INCH + HYPERSONIC TUNNEL A

WAS-RE ORIGINATING

04249

GROUP	CONFIG	MODEL	ACH NO	CALPSIAI	TOTG R)	ALPHA-MODEL	ALPHA-SECTOR	ALPHA=REBEND	MOLL-MODEL	YMM
A4	6	ORBITER #3	7.95	200.2	1299	44.53	-14.53	-30.00	-180.00	--00
P-TAF	P-TAF	O-TAF	V-TAF	RMS-INF	MU-INF	REFY	REFE	STREF		
(TOEG R)	(PSIAI)	(PSIAI)	(T/PIC)	(SLUGS/FIX)	(R-SLOC/FIX)	(R-F)	(R-E)	YME		
94.2	.022	.0M3	3801	1.977F-05	7.666C-08	5.704E 05	2.414E-02	4.120E-02		

CAMERA	ROLL NO	PAINT TEMP (DEG F)	INITIAL TEMP (DEG F)	SQUARE ROOT (PHOACK)	THICKNESS	WEIGHT
TOP (1)	8251					
SID (5)	8063	300	94	0.0544	2-862E-01	3-2095E-01
MOTION (R)	7747					

PIC NO	TIME	DELTIME	MATIO	M(TO)/HREF	M(-910)	M(-944TO)/HREF	M(-944TO)	M(-944TO)/HREF	ST(TO)
T	509(100)	9.76	6.141F-03	.2540	8.001E-03	.3248	7.094E-03	.2912	1.028E-02
S	4194(100)	9.76	6.141F-03	.2540	8.001E-03	.3248	7.094E-03	.2912	1.028E-02
M	6432(100)	10.61	5.831F-03	.2395	7.547E-03	.3101	6.685E-03	.2747	9.693E-03
T	510(100)	10.64	5.823E-03	.2392	7.54E-03	.3097	6.677E-03	.2743	9.680E-03
S	4194(100)	10.64	5.823F-03	.2392	7.54E-03	.3097	6.677E-03	.2743	9.680E-03
T	511(100)	11.89	5.527F-03	.2271	7.154E-03	.2939	6.337E-03	.2604	9.187E-03
M	6433(100)	11.89	5.527E-03	.2271	7.154E-03	.2939	6.337E-03	.2604	9.187E-03
S	4190(100)	11.91	5.520F-03	.2264	7.146E-03	.2936	6.330E-03	.2600	9.177E-03
T	512(100)	12.56	5.266E-03	.2163	6.817E-03	.2800	6.039E-03	.2480	8.152E-03
S	4191(100)	12.56	5.266E-03	.2163	6.817E-03	.2800	6.039E-03	.2480	8.152E-03
M	6434(100)	12.56	5.266E-03	.2163	6.817E-03	.2800	6.039E-03	.2480	8.152E-03
T	513(100)	14.04	5.039E-03	.2070	6.523E-03	.2640	5.776E-03	.2374	8.377E-03
S	4192(100)	14.04	5.039E-03	.2070	6.523E-03	.2640	5.776E-03	.2374	8.377E-03
T	514(100)	14.04	5.039E-03	.2070	6.523E-03	.2640	5.776E-03	.2374	8.377E-03
M	6435(100)	14.04	5.039E-03	.2070	6.523E-03	.2640	5.776E-03	.2374	8.377E-03
T	515(100)	15.12	4.839E-03	.1987	6.264E-03	.2572	5.549E-03	.2279	8.038E-03
S	4193(100)	15.12	4.839E-03	.1987	6.264E-03	.2572	5.549E-03	.2279	8.038E-03
M	6436(100)	15.12	4.839E-03	.1987	6.264E-03	.2572	5.549E-03	.2279	8.038E-03
T	516(100)	16.17	4.665E-03	.1916	6.039E-03	.2480	5.359E-03	.2197	7.749E-03
S	4194(100)	16.19	4.662E-03	.1915	6.034E-03	.2478	5.345E-03	.2195	7.746E-03
T	517(100)	16.19	4.662E-03	.1915	6.034E-03	.2478	5.345E-03	.2195	7.746E-03
M	6437(100)	17.24	4.505E-03	.1850	5.832E-03	.2395	5.168E-03	.2121	7.484E-03
T	518(100)	17.24	4.505E-03	.1850	5.832E-03	.2395	5.168E-03	.2121	7.484E-03
S	4195(100)	17.27	4.502E-03	.1849	5.828E-03	.2393	5.162E-03	.2120	7.477E-03
T	519(100)	18.32	4.361F-03	.1791	5.645E-03	.2319	5.000E-03	.2054	7.246E-03
M	6438(100)	18.32	4.361F-03	.1791	5.645E-03	.2319	5.000E-03	.2054	7.246E-03
T	520(100)	17.04	4.361F-03	.1791	5.645E-03	.2319	5.000E-03	.2054	7.246E-03

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NASA-R1 ORBITER PEATING AEDC(ARO-INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL R

VA289

GROUP CMF16 MODEL MACH NO PO(PSIA) TO(DEG R) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREBEND ROLL-MODEL YAW  
 86 6 ORBITER R3 7.95 208.3 1299 44.53 -14.53 -30.00 -180.00 -0.00

T-INF P-INF Q-INF V-INF RHO-INF MU-INF RE/FT HREF STREF  
 (DEG R) (PSIA) (PSIA) (FT/SEC) (SLUGS/FT3) (LB-SEC/FT2) (FT-1) (R/R .0175FT) (R/R .0175FT)  
 94.2 .022 .983 3801 1.458E-05 7.666E-08 9.710E 05 2.435E-02 4.119E-02

CAMERA ROLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHOXCK) TBAR(TO) BETA(TO)  
 TOP(IT) 8351  
 SIDE(S) 8063 300 84 .0544 2.862E-01 3.3093E-01  
 BOTTOM(B) 7747

PIC N1	TIME DELTME	M(TO)	M(TO)/HREF	M(.9TO)	M(.9TO)/HREF	M(.944TO)	M(.944TO)/HREF	ST(TO)
M 6440(100)	19.37 18.09	4.232E-03	.1738	5.479E-03	.2250	4.853E-03	.1993	7.029E-03
T 6181(100)	15.40 18.12	4.229E-03	.1736	5.475E-03	.2247	4.850E-03	.1991	7.022E-03
S 4197(100)	18.40 18.12	4.229E-03	.1736	5.475E-03	.2247	4.850E-03	.1991	7.022E-03
M 6441(100)	20.45 19.17	4.152E-03	.1688	5.323E-03	.2184	4.712E-03	.1935	6.823E-03
T 519(100)	20.47 19.19	4.159E-03	.1687	5.319E-03	.2184	4.712E-03	.1935	6.825E-03
S 4198(100)	20.47 19.19	4.159E-03	.1687	5.319E-03	.2184	4.712E-03	.1935	6.825E-03
T 520(100)	21.52 20.25	4.001E-03	.1643	5.179E-03	.2126	4.588E-03	.1883	6.842E-03
M 6442(100)	21.52 20.25	4.001E-03	.1643	5.179E-03	.2126	4.588E-03	.1883	6.842E-03
S 4199(100)	21.55 20.27	3.999E-03	.1641	5.176E-03	.2125	4.585E-03	.1882	6.838E-03
T 521(100)	22.60 21.32	3.899E-03	.1601	5.077E-03	.2072	4.470E-03	.1835	6.472E-03
M 6443(100)	22.60 21.32	3.899E-03	.1601	5.077E-03	.2072	4.470E-03	.1835	6.472E-03
S 4200(100)	22.63 21.35	3.846E-03	.1600	5.044E-03	.2071	4.464E-03	.1835	6.472E-03
T 522(100)	23.68 22.40	3.804E-03	.1562	4.924E-03	.2022	4.362E-03	.1791	6.318E-03
M 6444(100)	23.68 22.40	3.804E-03	.1562	4.924E-03	.2022	4.362E-03	.1791	6.318E-03
S 4201(100)	23.70 22.42	3.802E-03	.1561	4.921E-03	.2020	4.359E-03	.1790	6.311E-03
T 523(100)	24.75 23.47	3.716E-03	.1525	4.810E-03	.1975	4.261E-03	.1749	6.168E-03
M 6445(100)	24.75 23.47	3.716E-03	.1525	4.810E-03	.1975	4.261E-03	.1749	6.168E-03
S 4202(100)	24.78 23.50	3.714E-03	.1524	4.807E-03	.1973	4.258E-03	.1748	6.162E-03
T 524(100)	25.43 24.55	3.633E-03	.1491	4.703E-03	.1930	4.166E-03	.1710	6.029E-03
M 6446(100)	25.43 24.55	3.633E-03	.1491	4.703E-03	.1930	4.166E-03	.1710	6.029E-03
S 4203(100)	25.43 24.55	3.633E-03	.1491	4.703E-03	.1930	4.166E-03	.1710	6.029E-03
T 525(100)	27.21 25.93	3.536E-03	.1451	4.577E-03	.1878	4.054E-03	.1664	5.866E-03
M 6447(100)	27.21 25.93	3.536E-03	.1451	4.577E-03	.1878	4.054E-03	.1664	5.866E-03
S 4204(100)	27.23 25.95	3.534E-03	.1450	4.574E-03	.1877	4.052E-03	.1663	5.864E-03
M 6448(100)	29.23 27.95	3.405E-03	.1397	4.408E-03	.1809	3.904E-03	.1602	5.647E-03

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7/10/73

AEDC (AROTAC) ARNOLD AFS, TENNESSEE  
VON KARMAN GAS DYNAMICS FACILITY  
50 INCH HYPERSONIC TUNNEL R

NASA-R1 ORBITER HEATING

VA2R9

GROUP CONF16 MODEL MACH NO PO(PSIA) TO(DEG R) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREBEND ROLL-MODEL YAW  
84 6 ORBITER R3 7.95 208.7 1299 44.53 -14.53 -30.00 -180.00 -0.00

T-14F P-INF Q-INF V-INF MU-INF RHO-INF RE/FT MREF SIREF  
(DEG R) (PSIA) (FT/SEC) (SLUGS/FT3) (LB-SEC/FT2) (ET-1) (RZ-0175FT) (RZ-0175FT)

95.2 .022 .995 3801 1.042E-05 7.666E-08 9.729E 05 2.47E-02 4.115E-02

CAMFLA MOLL NO PAINT IF4P (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHOXCK) TBAR(TO) BETA(TO)

TOP(T) 8351 300 84 .0544 2.862E-01 3.3093E-01

SIGFIS) 8663

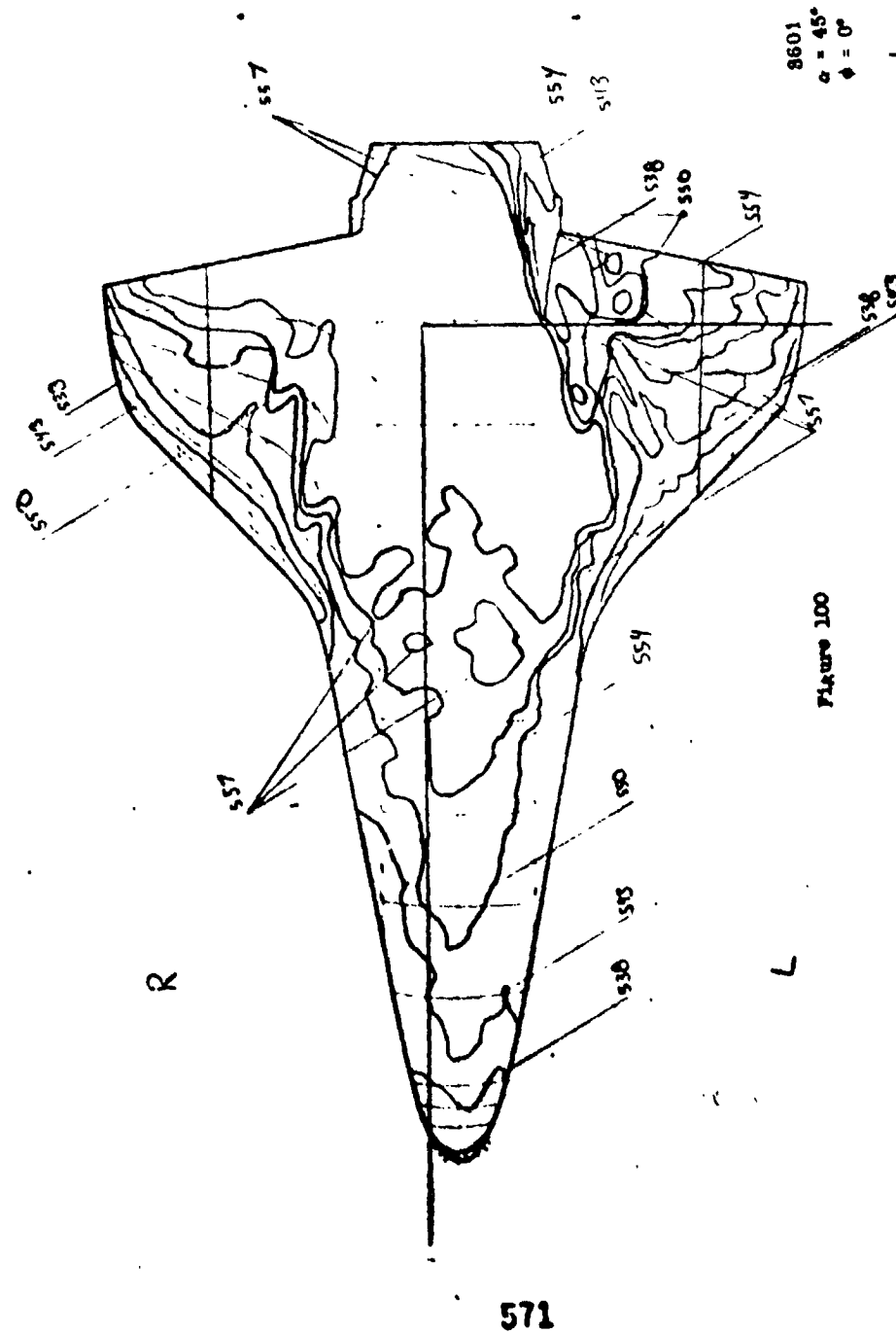
MOTCH(R) 7747

PIC NO	TIME RELTIME	H(TO)/HREF	H(-9TO)	H(-9TO)/HREF	H(-944TO)	H(-944TO)/HREF	ST(TO)
T 426(100)	29.26 27.98	1197	4.406E-03	1198	3.902E-03	1198	5.647E-03
S 4205(100)	29.26 27.98	1197	4.406E-03	1198	3.902E-03	1198	5.647E-03
T 427(100)	31.29 31.01	1149	4.254E-03	1146	3.768E-03	1146	5.451E-03
S 4206(100)	31.29 31.01	1149	4.254E-03	1146	3.768E-03	1146	5.451E-03
M 4449(100)	31.29 31.01	1149	4.254E-03	1146	3.768E-03	1146	5.451E-03
M 4450(100)	33.31 32.03	11305	4.117E-03	1129	3.647E-03	1129	5.273E-03
T 428(100)	33.31 32.03	11305	4.117E-03	1129	3.647E-03	1129	5.273E-03
S 4207(100)	33.31 32.03	11305	4.117E-03	1129	3.647E-03	1129	5.273E-03
T 429(100)	35.37 34.09	1266	3.991E-03	1266	3.534E-03	1266	5.116E-03
S 4208(100)	35.37 34.09	1266	3.991E-03	1266	3.534E-03	1266	5.116E-03
M 4451(100)	35.37 34.09	1266	3.991E-03	1266	3.534E-03	1266	5.116E-03
T 430(100)	35.49 34.11	1229	3.748E-03	1229	3.435E-03	1229	4.969E-03
S 4209(100)	35.49 34.11	1229	3.748E-03	1229	3.435E-03	1229	4.969E-03
M 4452(100)	35.49 34.11	1229	3.748E-03	1229	3.435E-03	1229	4.969E-03

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comp 87  
8063  
no



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7/10/73

NASA-R1 ORBITER PEATING AEDCIARO, INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL #

VA289

GROUP CONFID MODEL MACH NO POI(PSIA) TO(DEG R) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREBEND ROLL-MODEL YAW  
 #7 4 ORBITER R1 7.95 208.3 1299 44.52 -14.52 -30.00 -180.00 -0.00  
 T-1: F P-INF Q-INF Y-INF RMO-INF MU-INF RE/FT HREF STREF  
 (DEG R) (PSIA) (PSIA) (ET/SEC) (SLUGS/ET3) (LB-SEC/ET2) (ET-1) (R# .0175ET) (R# .0175ET)  
 95.3 .022 .983 3802 1.957E-05 7.670E-08 9.702E 05 2.435E-02 4.120E-02  
 CAMERA ROLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHO/CKK) TRAR(ITO) BETA(ITO)  
 TOP(IT) 8351  
 SIDE(S) 8063  
 MOTIC(M) 7747 78 .0535 0 0

PIC NO	TIME DELTIME	H(ITO)	H(ITO)/HREF	M(.970)	H(.944TO)	M(.944TO)/HREF	ST(ITO)
T 531(250)	1.18	MODEL HAS NOT REACHED CENTERLINE					
S 4210(250)	1.19	MODEL HAS NOT REACHED CENTERLINE					
M 4453(250)	1.18	MODEL HAS NOT REACHED CENTERLINE					
T 4211(250)	2.25	MODEL HAS NOT REACHED CENTERLINE					
M 4454(250)	2.25	MODEL HAS NOT REACHED CENTERLINE					
T 532(250)	2.28	MODEL HAS NOT REACHED CENTERLINE					
INJECT TIME =	2.30						
T 533(250)	3.33	DATA NOT YET VALID					
S 4212(250)	3.33	DATA NOT YET VALID					
M 4455(250)	3.33	DATA NOT YET VALID					
T 4456(250)	4.28	7.45RE-03	3059	9.446E-03	3975	8.450E-03	3470
T 4457(250)	4.41	7.428E-03	3048	9.408E-03	3860	8.425E-03	3457
S 4213(250)	4.41	7.428E-03	3048	9.408E-03	3860	8.425E-03	3457
T 535(250)	5.46	6.422E-03	2634	8.134E-03	3336	7.285E-03	2988
S 4214(250)	5.46	6.422E-03	2634	8.134E-03	3336	7.285E-03	2988
M 4457(250)	5.46	6.422E-03	2634	8.134E-03	3336	7.285E-03	2988
T 536(250)	6.53	5.725E-03	2348	7.250E-03	2974	6.494E-03	2664
S 4215(250)	6.53	5.725E-03	2348	7.250E-03	2974	6.494E-03	2664
M 4458(250)	6.53	5.725E-03	2348	7.250E-03	2974	6.494E-03	2664
T 537(250)	7.61	5.214E-03	2138	6.604E-03	2708	5.914E-03	2425
S 4216(250)	7.61	5.214E-03	2138	6.604E-03	2708	5.914E-03	2425
M 4459(250)	7.61	5.214E-03	2138	6.604E-03	2708	5.914E-03	2425
T 538(250)	8.68	4.820E-03	1977	6.104E-03	2503	5.467E-03	2242
S 4217(250)	8.68	4.820E-03	1977	6.104E-03	2503	5.467E-03	2242
M 4460(250)	8.68	4.820E-03	1977	6.104E-03	2503	5.467E-03	2242
T 539(250)	9.76	4.503E-03	1846	5.703E-03	2338	5.108E-03	2094
S 4218(250)	9.76	4.503E-03	1846	5.703E-03	2338	5.108E-03	2094
M 4461(250)	9.76	4.503E-03	1846	5.703E-03	2338	5.108E-03	2094

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7/10/73

NASA-RI ORBITER PEATING AEDCIARO, INC., ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL R

VA209

GROUP CONFIG MODEL MACH NO PR(PISA) TO(IDEG R) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREBEND ROLL-MODEL YAW  
 #7 4 ORBITER R1 7.95 209.0 1300 44.52 -14.52 -30.00 -100.00 -0.00

T-INF P-INF Q-INF V-INF MU-INF RHO-INF RE/FT HREF STREF  
 (DEG R) (PSIA) (FT/SFC) (SLUGS/FT3) (LB-SEC/FT2) (FT-1) (R= .0175FI) (R= .0175FI)

94.3 .022 .986 3802 1.064E-05 7.670E-08 9.734E 05 2.439E-02 4.114E-02

CAMERA ROLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHOXCKK) TRAR(TO) BETA(TO)

TOP(T) 8351  
 SIDE(S) 8063  
 BOTTOM(B) 7747

2.259E-01 2.4493E-01

.0535

PIC NO	TIME DELTIME	H(TO)	H(TO)/HREF	M(.9TO)	M(.9TO)/HREF	M(.944TO)	M(.944TO)/HREF	ST(TO)
M 6462(250)	10.81	9.52	4.247E-03	5.379E-03	.2204	4.814E-03	.1974	7.047E-03
T 540(250)	10.84	9.54	4.241E-03	5.372E-03	.2203	4.811E-03	.1973	7.045E-03
S 4219(250)	10.84	9.54	4.241E-03	5.372E-03	.2203	4.811E-03	.1973	7.045E-03
M 6463(250)	11.51	10.62	4.021E-03	5.093E-03	.2087	4.561E-03	.1870	6.675E-03
T 541(250)	11.51	10.62	4.021E-03	5.093E-03	.2087	4.561E-03	.1870	6.675E-03
S 4220(250)	11.51	10.62	4.021E-03	5.093E-03	.2087	4.561E-03	.1870	6.675E-03
M 6464(250)	12.86	11.67	3.836E-03	4.858E-03	.1991	4.351E-03	.1783	6.368E-03
T 542(250)	12.86	11.67	3.836E-03	4.858E-03	.1991	4.351E-03	.1783	6.368E-03
S 4221(250)	12.86	11.67	3.836E-03	4.858E-03	.1991	4.351E-03	.1783	6.368E-03
M 6465(250)	14.04	12.75	3.670E-03	4.648E-03	.1905	4.163E-03	.1706	6.091E-03
T 543(250)	14.04	12.75	3.670E-03	4.648E-03	.1905	4.163E-03	.1706	6.091E-03
S 4222(250)	14.04	12.75	3.670E-03	4.648E-03	.1905	4.163E-03	.1706	6.091E-03
M 6466(250)	15.12	13.82	3.524E-03	4.464E-03	.1829	3.998E-03	.1638	5.848E-03
T 544(250)	15.12	13.82	3.524E-03	4.464E-03	.1829	3.998E-03	.1638	5.848E-03
S 4223(250)	15.12	13.82	3.524E-03	4.464E-03	.1829	3.998E-03	.1638	5.848E-03
M 6467(250)	16.19	14.90	3.395E-03	4.300E-03	.1762	3.851E-03	.1578	5.633E-03
T 545(250)	16.19	14.90	3.395E-03	4.300E-03	.1762	3.851E-03	.1578	5.633E-03
S 4224(250)	16.19	14.90	3.395E-03	4.300E-03	.1762	3.851E-03	.1578	5.633E-03
M 6468(250)	17.24	15.95	3.278E-03	4.152E-03	.1702	3.722E-03	.1524	5.440E-03
T 546(250)	17.24	15.95	3.278E-03	4.152E-03	.1702	3.722E-03	.1524	5.440E-03
S 4225(250)	17.24	15.95	3.278E-03	4.152E-03	.1702	3.722E-03	.1524	5.440E-03
M 6469(250)	18.32	17.03	3.176E-03	4.022E-03	.1647	3.602E-03	.1475	5.265E-03
T 547(250)	18.32	17.03	3.176E-03	4.022E-03	.1647	3.602E-03	.1475	5.265E-03
S 4226(250)	18.32	17.03	3.176E-03	4.022E-03	.1647	3.602E-03	.1475	5.265E-03
M 6470(250)	19.40	18.10	3.040E-03	3.901E-03	.1598	3.493E-03	.1431	5.106E-03
T 548(250)	19.40	18.10	3.040E-03	3.901E-03	.1598	3.493E-03	.1431	5.106E-03
S 4227(250)	19.40	18.10	3.040E-03	3.901E-03	.1598	3.493E-03	.1431	5.106E-03

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7/10/73

NASA-RI ORBITER HEATING AEDC(ARO, INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL B

GROUP CONFID MODEL MACH NO PO(P(SIA) TO( DEG R) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREBEND ROLL-MODEL YAW  
 87 4 209.4 1300 44.52 -14.52 -30.00 -180.00 -0.00  
 T-INF P-INF O-INF V-INF MU-INF MU-INF RE/FT MREF STREF  
 (DEG R) (PSIA) (PSIA) (PSIA) (LBS/SEC/FT) (LBS/SEC/FT) (LBS/SEC/FT) (LBS/SEC/FT) (LBS/SEC/FT)  
 9.3 0.22 0.98 3802 1.047E-05 7.671E-08 5.752E 05 2.441E-02 4.110E-02  
 CAMERA ROLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHOXCK) TRAR(TO) BETAR(TO)  
 TOP(T) 8351  
 SIDE(S) 8063  
 MOLICMIRI 7747 2.259E-01 2.4493E-01

PTC NO	TIME DELTIME	M(TO)	M(TO)/MREF	M(.910)	M(.910)/MREF	M(.944TO)	M(.944TO)/MREF	ST(TO)
T 549(250)	20.47	19.18	2.992E-03	1.226	3.790E-03	1.553	3.394E-03	1.390
S 4724(250)	20.47	19.18	2.992E-03	1.226	3.790E-03	1.553	3.394E-03	1.390
M 6471(250)	20.47	19.18	2.992E-03	1.226	3.790E-03	1.553	3.394E-03	1.390
T 550(250)	21.55	20.24	2.911E-03	1.193	3.688E-03	1.510	3.303E-03	1.353
S 4224(250)	21.55	20.24	2.911E-03	1.193	3.688E-03	1.510	3.303E-03	1.353
M 6472(250)	21.55	20.24	2.911E-03	1.193	3.688E-03	1.510	3.303E-03	1.353
T 551(250)	22.60	21.31	2.839E-03	1.163	3.595E-03	1.473	3.220E-03	1.319
S 4473(250)	22.60	21.31	2.839E-03	1.163	3.595E-03	1.473	3.220E-03	1.319
M 6473(250)	22.60	21.31	2.839E-03	1.163	3.595E-03	1.473	3.220E-03	1.319
T 552(250)	22.63	21.31	2.837E-03	1.162	3.593E-03	1.471	3.218E-03	1.318
S 4231(250)	22.63	21.31	2.837E-03	1.162	3.593E-03	1.471	3.218E-03	1.318
M 6474(250)	22.63	21.31	2.837E-03	1.162	3.593E-03	1.471	3.218E-03	1.318
T 553(250)	25.43	24.14	2.667E-03	1.092	3.376E-03	1.383	3.024E-03	1.239
S 4475(250)	25.43	24.14	2.667E-03	1.092	3.376E-03	1.383	3.024E-03	1.239
M 6475(250)	25.43	24.14	2.667E-03	1.092	3.376E-03	1.383	3.024E-03	1.239
T 554(250)	27.48	26.19	2.561E-03	1.048	3.243E-03	1.328	2.905E-03	1.189
S 4233(250)	27.48	26.19	2.561E-03	1.048	3.243E-03	1.328	2.905E-03	1.189
M 6476(250)	27.48	26.19	2.561E-03	1.048	3.243E-03	1.328	2.905E-03	1.189
T 555(250)	29.51	28.22	2.467E-03	1.010	3.124E-03	1.279	2.798E-03	1.145
S 4234(250)	29.51	28.22	2.467E-03	1.010	3.124E-03	1.279	2.798E-03	1.145
M 6477(250)	29.51	28.22	2.467E-03	1.010	3.124E-03	1.279	2.798E-03	1.145
T 556(250)	31.54	30.24	2.363E-03	0.975	3.018E-03	1.235	2.703E-03	1.106
S 4478(250)	31.54	30.24	2.363E-03	0.975	3.018E-03	1.235	2.703E-03	1.106
M 6478(250)	31.54	30.24	2.363E-03	0.975	3.018E-03	1.235	2.703E-03	1.106
T 557(250)	33.56	32.27	2.307E-03	0.944	2.922E-03	1.196	2.617E-03	1.071

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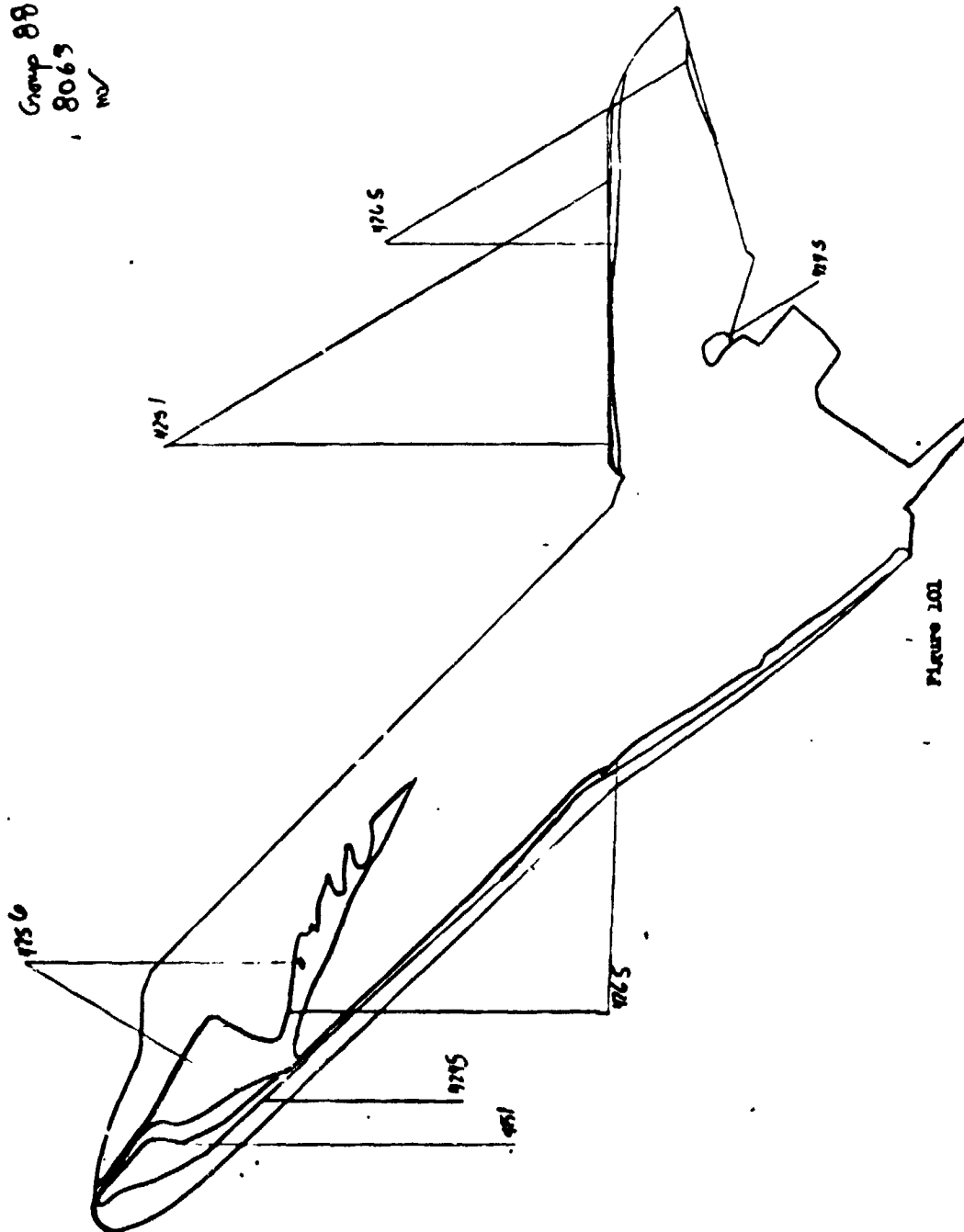
7/10/73

NASA-81 ORBITER HEATING AEDC(ARO, INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 VA200 50 INCH HYPERSONIC TUNNEL R

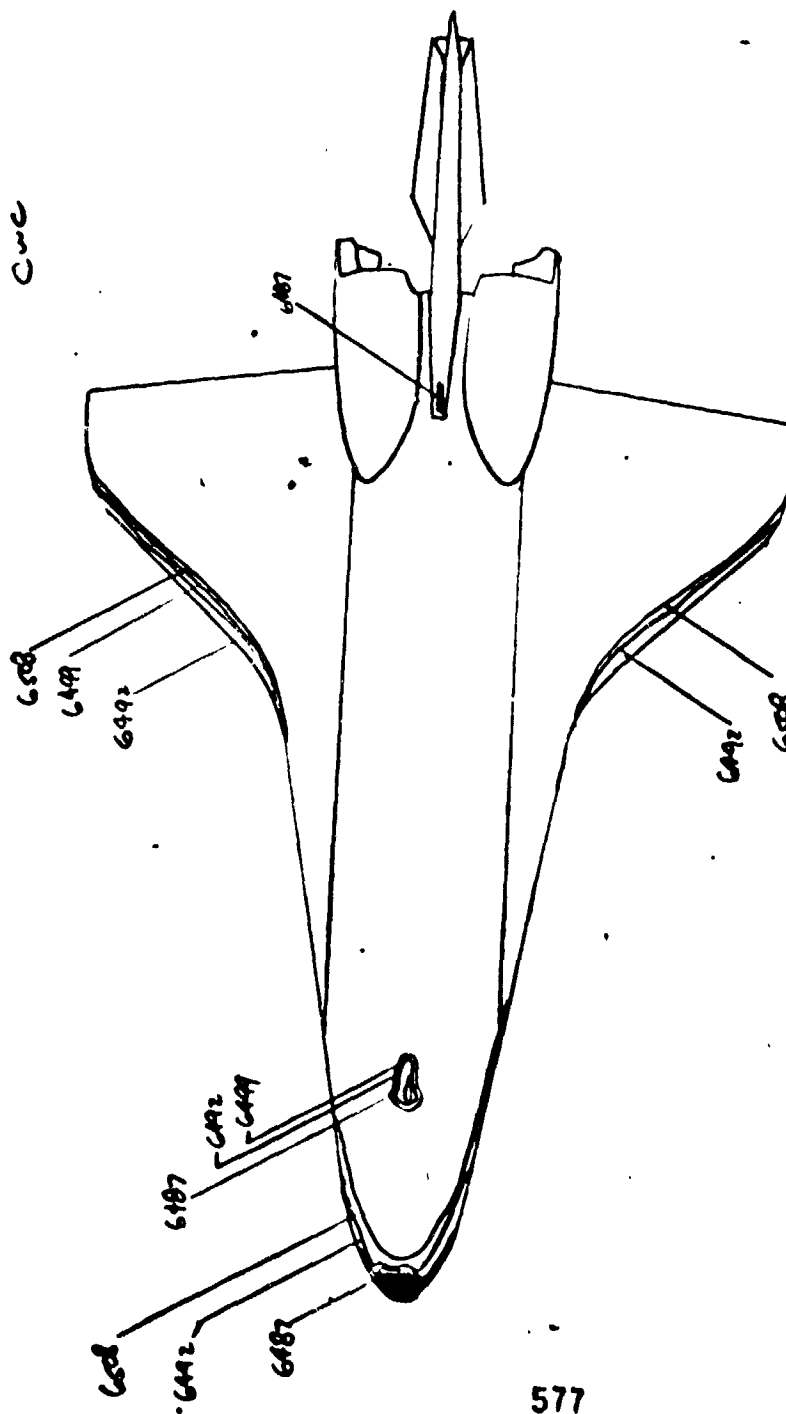
GROUP COWF16 MODEL MACH NO PO(P5IA) TO( DEG R) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREBEND ROLL-MODEL YAW  
 87 4 ORBITER R1 7.95 200.8 1300 48.52 -14.52 -30.00 -180.00 -0.00  
 T-INF P-INF Q-INF V-INF W-INF MU-INF RE/FT MREF STREF  
 (DEG R) (P5IA) (P5IA) (FT/SEC) (LB-SEC/FT2) (FT-1) (R= .0175E1) (R= .0175E1)  
 95.3 .022 .990 3803 1.971E-05 7.671E-08 9.769E 05 2.444E-02 4.106E-02  
 CAMERA ROLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (INCH/CAK) TRAR(TO) BETA(TO)  
 TOP(T) 8351  
 SIDE(S) 8863  
 BOTTOM(B) 7747  
 250 78 .0535 2.259E-01 2.4493E-01

PTC NO	TIME DELTIME	H(TO)	H(TO)/HREF	M(.910)	M(.910)/HREF	M(.944TO)	M(.944TO)/HREF	ST(TO)
T 557(250)	33.59	32.37	2.306E-03	.0944	2.920E-03	.1195	2.616E-03	.1071
S 4236(250)	33.59	32.37	2.306E-03	.0944	2.920E-03	.1195	2.616E-03	.1071
MODEL HAS LEFT CENTERLINE								
T 558(250)	35.62	34.32	2.237E-03	.0915	2.833E-03	.1160	2.537E-03	.1038
M 4237(250)	35.62	34.32	2.237E-03	.0915	2.833E-03	.1160	2.537E-03	.1038
T 559(250)	37.64	36.35	2.173E-03	.0889	2.753E-03	.1126	2.465E-03	.1009
S 4238(250)	37.64	36.35	2.173E-03	.0889	2.753E-03	.1126	2.465E-03	.1009
M 4401(250)	37.64	36.35	2.173E-03	.0889	2.753E-03	.1126	2.465E-03	.1009
T 560(250)	39.67	38.38	2.115E-03	.0866	2.679E-03	.1096	2.399E-03	.0982
M 4402(250)	39.67	38.38	2.115E-03	.0866	2.679E-03	.1096	2.399E-03	.0982
S 4239(250)	39.70	38.40	2.115E-03	.0865	2.679E-03	.1096	2.399E-03	.0981

Group 88  
8063  
m



7147  
6788  
CWC



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Figure 102

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7/10/73

NASA-R1 ORBITER HEATING

AEDCIARO-INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL R

VA200

GROUP CNF16 MODEL MACH NO POISSIA TO (DEG R) ALPHA-SECTOR ALPHA-PREREND ROLL-MODEL YAN  
 PR 2 ORBITER S 7.95 210.2 1300 44.04 -14.04 -30.00 -130.00 -.00

T-1AF P-1NF Q-1NF V-1NF ANO-1NF MU-1NF RE/FT MREF STREF  
 (DEG R) (PSIA) (FT/SEC) (SLUGS/FT) (LB-SEC/FT) (FI-1) (R-0175FI) (H-0175FI)  
 00.1 .022 .002 3003 1.074E-05 7.675E-08 9.701E-05 2.446E-02 4.103E-02

CAMERA ROLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHOXCK) TBAR (TO) BE (A(TO))  
 TOP (T) 0251 131 00 .0486 0 0  
 SLUGS 0063  
 MOTIC (B) 7747

PIC NO TIME DELTME M(10) M(10)/MREF M(10) M(10)/MREF M(10) M(10)/MREF ST(10)

M 6483(131) 1.15 MODEL HAS NOT REACHED CENTERLINE  
 T 6481(131) 1.10 MODEL HAS NOT REACHED CENTERLINE  
 S 6240(131) 1.10 MODEL HAS NOT REACHED CENTERLINE  
 T 6421(131) 2.25 MODEL HAS NOT REACHED CENTERLINE  
 S 6241(131) 2.25 MODEL HAS NOT REACHED CENTERLINE  
 M 6444(131) 2.25 MODEL HAS NOT REACHED CENTERLINE  
 INJECT TIME = 2.20

M 6445(131) 3.10 DATA NOT YET VALID  
 T 6431(131) 3.23 DATA NOT YET VALID

S 6242(131) 3.23 DATA NOT YET VALID

T 6431(131) 3.23 DATA NOT YET VALID

S 6243(131) 3.23 DATA NOT YET VALID

M 6446(131) 3.23 DATA NOT YET VALID

T 6447(131) 3.23 DATA NOT YET VALID

S 6244(131) 3.23 DATA NOT YET VALID

T 6448(131) 3.23 DATA NOT YET VALID

S 6245(131) 3.23 DATA NOT YET VALID

M 6449(131) 3.23 DATA NOT YET VALID

T 6450(131) 3.23 DATA NOT YET VALID

S 6246(131) 3.23 DATA NOT YET VALID

T 6451(131) 3.23 DATA NOT YET VALID

S 6247(131) 3.23 DATA NOT YET VALID

M 6452(131) 3.23 DATA NOT YET VALID

T 6453(131) 3.23 DATA NOT YET VALID

S 6248(131) 3.23 DATA NOT YET VALID

T 6454(131) 3.23 DATA NOT YET VALID

S 6249(131) 3.23 DATA NOT YET VALID

M 6455(131) 3.23 DATA NOT YET VALID

T 6456(131) 3.23 DATA NOT YET VALID

S 6250(131) 3.23 DATA NOT YET VALID

T 6457(131) 3.23 DATA NOT YET VALID

S 6251(131) 3.23 DATA NOT YET VALID

M 6458(131) 3.23 DATA NOT YET VALID

T 6459(131) 3.23 DATA NOT YET VALID

S 6252(131) 3.23 DATA NOT YET VALID

T 6460(131) 3.23 DATA NOT YET VALID

S 6253(131) 3.23 DATA NOT YET VALID

M 6461(131) 3.23 DATA NOT YET VALID

T 6462(131) 3.23 DATA NOT YET VALID

S 6254(131) 3.23 DATA NOT YET VALID

T 6463(131) 3.23 DATA NOT YET VALID

S 6255(131) 3.23 DATA NOT YET VALID

M 6464(131) 3.23 DATA NOT YET VALID

360

578

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7/10/73

# NASA-RI ORBITER HEATING

AEDC(AROS-INC.) ARNOLD AFS, TENNESSEE  
VON KARMAN GAS DYNAMICS FACILITY  
50 INCH HYPERSONIC TUNNEL R

VA289

GROUP	CONFIG	MODEL	MACH NO	PO(PISA)	TO( DEG R)	ALPHA-MODEL	ALPHA-SECTOR	ALPHA-PREBEND	ROLL-MODEL	YAW
RR	2	ORBITER S	7.95	211.0	1300	44.84	-14.84	-30.00	-180.00	-0.00
T-INF	P-INF	Q-INF	V-INF	RHO-INF	MU-INF	DE/FT	NREF	STREF		
(DEG R)	(PSIA)	(FT/SEC)	(SLUGS/FT <sup>3</sup> )	(LB-SEC/FT <sup>2</sup> )	(FT-L)	(R <sup>2</sup> -0.175E1)	(R <sup>2</sup> -0.175E1)			
95.3	0.23	996	3803	1.091E-05	7.675E-8	9.417E-05	2.451E-02	4.096E-02		
CAMERA	ROLL NO	PAINT (DEG F)	INITIAL TEMP (DEG F)	SQUARE ROOT (RHO/CK)	TBAR(TO)	BETA(TO)				
TOP(T)	8251									
SIDE(S)	8063									
MOTOM(G)	7747									

PIC NO	TIME DELTIME	H(TO)	H(TO)/MREF	H(9TO)	H(9TO)/MREF	H(944TO)	H(944TO)/MREF	ST(TO)
M 6501(131)	20.40	19.11	5.982E-04	0.285	8.522E-04	0.348	7.759E-04	0.316
T 679(131)	20.42	19.13	6.978E-04	0.285	8.517E-04	0.348	7.754E-04	0.316
S 4250(131)	20.42	19.13	5.978E-04	0.285	8.517E-04	0.348	7.754E-04	0.316
T 680(131)	21.47	20.18	6.744E-04	0.277	8.292E-04	0.338	7.549E-04	0.308
M 6502(131)	21.47	20.18	6.744E-04	0.277	8.292E-04	0.338	7.549E-04	0.308
T 4259(131)	21.50	20.21	6.740E-04	0.277	8.287E-04	0.338	7.544E-04	0.308
T 681(131)	22.55	21.26	6.620E-04	0.270	8.079E-04	0.330	7.355E-04	0.300
S 4260(131)	22.55	21.26	6.620E-04	0.270	8.079E-04	0.330	7.355E-04	0.300
M 6503(131)	22.55	21.26	6.620E-04	0.270	8.079E-04	0.330	7.355E-04	0.300
T 682(131)	23.60	22.31	6.462E-04	0.264	7.887E-04	0.322	7.180E-04	0.293
M 6504(131)	23.60	22.31	6.462E-04	0.264	7.887E-04	0.322	7.180E-04	0.293
T 4261(131)	23.63	22.33	6.458E-04	0.263	7.882E-04	0.322	7.176E-04	0.293
M 6505(131)	25.15	23.84	6.244E-04	0.255	7.626E-04	0.311	6.943E-04	0.283
T 4262(131)	25.18	23.84	6.244E-04	0.255	7.626E-04	0.311	6.943E-04	0.283
M 6506(131)	25.18	23.84	6.244E-04	0.255	7.626E-04	0.311	6.943E-04	0.283
T 4263(131)	27.18	25.89	5.998E-04	0.245	7.321E-04	0.298	6.665E-04	0.272
M 6507(131)	27.21	25.91	5.998E-04	0.245	7.321E-04	0.298	6.665E-04	0.272
T 4264(131)	27.23	25.91	5.998E-04	0.245	7.321E-04	0.298	6.665E-04	0.272
M 6508(131)	29.23	27.94	5.774E-04	0.236	7.047E-04	0.287	6.416E-04	0.262
T 4265(131)	29.23	27.94	5.774E-04	0.236	7.047E-04	0.287	6.416E-04	0.262
M 6509(131)	31.26	29.97	5.575E-04	0.227	6.805E-04	0.277	6.195E-04	0.253
T 4266(131)	31.26	29.97	5.575E-04	0.227	6.805E-04	0.277	6.195E-04	0.253
M 6510(131)	33.29	32.00	5.346E-04	0.220	6.585E-04	0.269	5.995E-04	0.245
T 4267(131)	33.29	32.00	5.346E-04	0.220	6.585E-04	0.269	5.995E-04	0.245

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NASA-R1 ORBITER HEATING  
 VA2R9  
 AEDC(ARO,INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL R

GROUP CONFID MODEL MACH NO PO(PSIA) TO(IDEG R) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREBEND ROLL-MODEL YAW  
 BR 2 ORBITER S 7.95 211.1 1300 44.84 -14.84 -30.00 -190.00 -0.00

T-1AF P-INF Q-INF V-INF RHO-INF MU-INF RF/FT HREF STREF  
 (DEG R) (PSIA) (PSIA) (FT/SEC) (SLUGS/FT<sup>3</sup>) (LB-SEC/FT<sup>2</sup>) (FT-1) (R= .0175E1) (R= .0175E1)  
 95.3 .023 .996 3803 1.002E-05 7.674E-02 9.025E 05 2.451E-02 4.094E-02

CAMERA ROLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHOXCAK) TBAR(10) BETA(10)  
 TOP(T) 8351  
 SIDE(S) 8063  
 BOTTOM(B) 7747  
 131 R0 .0486 6.709E-02 6.2799E-02

PIC NO	TIME DELTIME	H(10)	H(10)/HREF	H(10)	H(10)/HREF	H(10)	H(10)/HREF	ST(10)
S 4266(131)	33.31 32.02	5.394E-04	.0220	6.583E-04	.0268	5.993E-04	.0244	8.925E-04
M 6510(131)	35.32 34.02	5.232E-04	.0213	6.384E-04	.0260	5.814E-04	.0237	8.654E-04
T 588(131)	35.34 34.05	5.231E-04	.0213	6.384E-04	.0260	5.812E-04	.0237	8.655E-04
S 4267(131)	35.34 34.05	5.231E-04	.0213	6.384E-04	.0260	5.812E-04	.0237	8.655E-04
T 589(131)	37.27 36.08	5.041E-04	.0207	6.202E-04	.0253	5.646E-04	.0230	8.408E-04
S 4268(131)	37.27 36.08	5.041E-04	.0207	6.202E-04	.0253	5.646E-04	.0230	8.408E-04
M 6511(131)	37.27 36.08	5.041E-04	.0207	6.202E-04	.0253	5.646E-04	.0230	8.408E-04
T 590(131)	39.40 38.10	4.944E-04	.0202	6.035E-04	.0246	5.494E-04	.0224	8.182E-04
S 4269(131)	39.40 38.10	4.944E-04	.0202	6.035E-04	.0246	5.494E-04	.0224	8.182E-04
M 6512(131)	39.40 38.10	4.944E-04	.0202	6.035E-04	.0246	5.494E-04	.0224	8.182E-04

3/3

Group 89  
8063  
ms

8601  
 $\alpha = 45^\circ$   
 $\phi = 0^\circ$

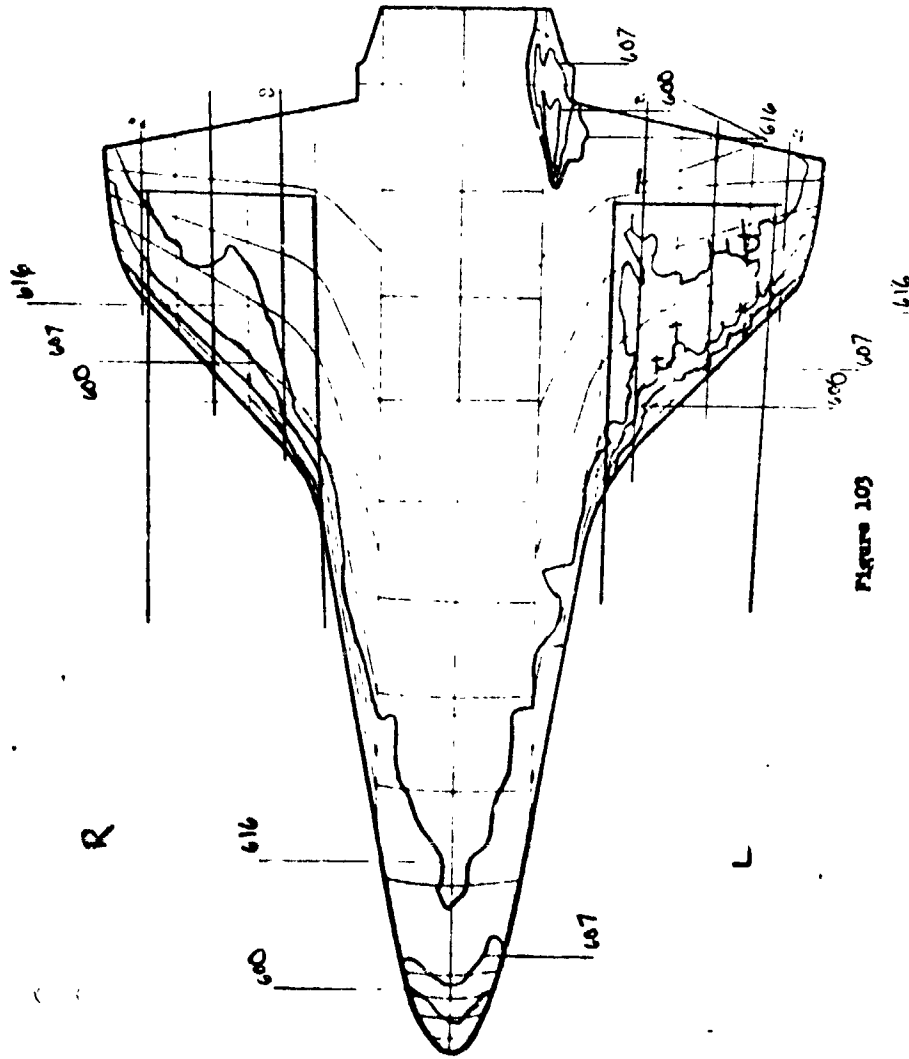


Figure 103

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7/10/73

NASA-RI ORBITER PEATING AED(ARO, INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL R  
 VA299

GROUP CNVFTG MODEL MAT NO PO(P(SIA) TO( DEG R) ALPHA-MODEL ALPHA-SECTOR ALPHA-PRBEND ROLL-MODEL YAW  
 89 7 ORBITER R4 7.95 210.4 1301 44.85 -14.85 -30.00 -180.00 -0.00

T-INF P-INF Q-INF V-INF RHO-INF MU-INF RF/FT MREF STREF  
 (DEG R) (PSIA) (F/SEC) (SLUGS/FI3) (LB-SECT/F2) (ET-1) (R2 .0175ET) (R2 .0175ET)  
 95.3 .022 .993 3004 1.075E-05 7.670E-08 9.780E 05 2.448E-02 4.102E-02

CAMERA ROLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHOXCK) T8AR(TO) BETA(TO)

TOP(T) 8351  
 SIDE(S) 8063  
 MOT(M) 7747

PIC NO TIME DELTIME HITOI M(TO)/MREF M(.9TO) MREF M(.944TO) M(.944TO) MREF ST(TO)

T 5913000 1.18 MODEL HAS NOT REACHED CENTERLINE  
 M 65131000 1.18 MODEL HAS NOT REACHED CENTERLINE  
 S 42703000 1.20 MODEL HAS NOT REACHED CENTERLINE  
 T 5921000 2.25 MODEL HAS NOT REACHED CENTERLINE  
 M 45141000 2.25 MODEL HAS NOT REACHED CENTERLINE  
 S 42713000 2.28 MODEL HAS NOT REACHED CENTERLINE

INJECT TIME = 2.38

T 5913000 3.33 DATA NOT YET VALID

S 42723000 3.23 DATA NOT YET VALID

M 65151000 3.23 DATA NOT YET VALID

T 5941000 4.38 3.09 1.044E-02 .4262 1.350E-02 .5312 1.194E-02 .4876 1.718E-02 3.64

M 65141000 4.38 3.09 1.044E-02 .4262 1.350E-02 .5312 1.194E-02 .4876 1.718E-02 3.64

S 42731000 4.41 3.11 1.040E-02 .4264 1.345E-02 .5489 1.189E-02 .4855 1.708E-02 3.64

T 5951000 5.46 4.16 8.929E-03 .3694 1.163E-02 .4744 1.024E-02 .4197 1.470E-02 3.64

M 45171000 5.46 4.16 8.929E-03 .3694 1.163E-02 .4744 1.024E-02 .4197 1.470E-02 3.64

S 42741000 5.48 4.19 8.902E-03 .3659 1.159E-02 .4732 1.025E-02 .4187 1.473E-02 3.64

T 5961000 6.53 5.24 8.013E-03 .3271 1.034E-02 .4230 9.167E-03 .3742 1.316E-02 3.64

M 65141000 6.53 5.24 8.013E-03 .3271 1.034E-02 .4230 9.167E-03 .3742 1.316E-02 3.64

S 42751000 6.56 5.26 7.944E-03 .3262 1.034E-02 .4219 9.146E-03 .3732 1.313E-02 3.64

T 5971000 7.61 6.32 7.298E-03 .2974 9.439E-03 .3852 8.350E-03 .3408 1.198E-02 3.64

S 42761000 7.61 6.32 7.298E-03 .2974 9.439E-03 .3852 8.350E-03 .3408 1.198E-02 3.64

M 65141000 7.61 6.32 7.298E-03 .2974 9.439E-03 .3852 8.350E-03 .3408 1.198E-02 3.64

T 5981000 8.66 7.37 6.759E-03 .2757 8.739E-03 .3546 7.731E-03 .3154 1.109E-02 3.64

M 65201000 8.66 7.37 6.759E-03 .2757 8.739E-03 .3546 7.731E-03 .3154 1.109E-02 3.64

S 42771000 8.68 7.39 6.746E-03 .2753 8.725E-03 .3501 7.718E-03 .3150 1.108E-02 3.64

T 5991000 9.74 8.44 6.312E-03 .2575 8.163E-03 .3331 7.222E-03 .2947 1.036E-02 3.64

S 42781000 9.74 8.44 6.312E-03 .2575 8.163E-03 .3331 7.222E-03 .2947 1.036E-02 3.64

M 4521000 9.74 8.44 6.312E-03 .2575 8.163E-03 .3331 7.222E-03 .2947 1.036E-02 3.64

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7/10/73

NASA-RI ORBITER HEATING AEDCLARO, INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL R

VA289

GROUP CONFIG MODEL MACH NO ALPHA-MODEL ALPHA-SECTOR ALPHA-PREBEND ROLL-MODEL YAW  
 P9 7 ORBITER R4 7.95 211.0 1300 44.85 -14.85 -30.00 -180.00 -0.00

T-INF P-INF Q-INF V-INF MU-INF RMO-INF MU-INF RF/FT MREF SIREF  
 (DEG R) (PSIA) (FT/SEC) (SLUGS/FT<sup>3</sup>) (LB-SEC/FT<sup>2</sup>) (FI-1) (R<sub>2</sub> .0175FI) (R<sub>2</sub> .0175FI)  
 95.3 .023 .996 3804 1.981F-05 7.676E-08 9.816E-05 2.445E-02 4.096F-02

CAMERA ROLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHOACXK) TRARITO BETA(10)  
 TOP(T) 8351 79 .0544 2.902E-01 3.3717E-01  
 SIDE(S) 8063  
 BOTTOM(B) 7747

PIC NO	TIME DELT	H(10)	H(10)/HREF	H(.970)	H(.970)/HREF	H(.9440)	H(.9440)/HREF	ST(10)
T 400(100)	10.81	9.52	5.945E-03	.2426	7.688E-03	.3138	6.801E-03	.2776
S 4274(100)	10.81	9.52	5.945E-03	.2426	7.688E-03	.3138	6.801E-03	.2776
M 4221(100)	10.81	9.52	5.945E-03	.2426	7.688E-03	.3138	6.801E-03	.2776
T 401(100)	11.86	10.57	5.631E-03	.2302	7.296E-03	.2972	6.447E-03	.2633
S 4280(100)	11.89	10.57	5.631E-03	.2302	7.296E-03	.2972	6.447E-03	.2633
M 4281(100)	11.89	10.57	5.631E-03	.2302	7.296E-03	.2972	6.447E-03	.2633
T 402(100)	12.54	11.65	5.375E-03	.2192	6.951E-03	.2834	6.142E-03	.2508
S 4282(100)	12.56	11.67	5.375E-03	.2190	6.943E-03	.2833	6.142E-03	.2506
M 4283(100)	12.56	11.67	5.375E-03	.2190	6.943E-03	.2833	6.142E-03	.2506
T 403(100)	14.02	12.72	5.142E-03	.2097	6.650E-03	.2713	5.883E-03	.2400
S 4284(100)	14.02	12.72	5.142E-03	.2097	6.650E-03	.2713	5.883E-03	.2400
M 4285(100)	14.02	12.72	5.142E-03	.2097	6.650E-03	.2713	5.883E-03	.2400
T 404(100)	15.09	13.80	4.933E-03	.2014	6.386E-03	.2604	5.649E-03	.2304
S 4286(100)	15.09	13.80	4.933E-03	.2014	6.386E-03	.2604	5.649E-03	.2304
M 4287(100)	15.09	13.80	4.933E-03	.2014	6.386E-03	.2604	5.649E-03	.2304
T 405(100)	16.14	14.85	4.756E-03	.1941	6.155E-03	.2510	5.445E-03	.2221
S 4288(100)	16.17	14.88	4.756E-03	.1939	6.150E-03	.2508	5.441E-03	.2219
M 4289(100)	16.17	14.88	4.756E-03	.1939	6.150E-03	.2508	5.441E-03	.2219
T 406(100)	17.22	15.93	4.596E-03	.1873	5.944E-03	.2423	5.254E-03	.2143
S 4290(100)	17.24	15.95	4.592E-03	.1873	5.939E-03	.2422	5.254E-03	.2143
M 4291(100)	17.24	15.95	4.592E-03	.1873	5.939E-03	.2422	5.254E-03	.2143
T 407(100)	18.30	17.00	4.448E-03	.1814	5.753E-03	.2345	5.089E-03	.2075
S 4292(100)	18.30	17.00	4.448E-03	.1814	5.753E-03	.2345	5.089E-03	.2075
M 4293(100)	18.32	17.03	4.445E-03	.1812	5.744E-03	.2343	5.085E-03	.2073
T 408(100)	19.37	18.08	4.314E-03	.1758	5.579E-03	.2274	4.935E-03	.2012
S 4294(100)	19.37	18.08	4.314E-03	.1758	5.579E-03	.2274	4.935E-03	.2012
M 4295(100)	19.37	18.08	4.314E-03	.1758	5.579E-03	.2274	4.935E-03	.2012

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NASA-RI ORBITER HEATING AEDC(ARO, INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL R

VA2R9

GROUP CONFIG MODEL MACH NO PO(PSTA) TO(CEG R) ALPHA-MODEL LPHA-SECTOR ALPHA-PREBEND ROLL-MODEL YAW  
 89 7 ORBITER R4 7.95 211.4 1301 4.85 -14.85 -30.00 -180.00 -0.00

T-INF P-INF Q-INF R-INF MU-INF HE/FT MREF STREF  
 (DEG R) (PSIA) (PSIA) (PSIA) (LB-SEC/FT) (LB-SEC/FT) (R=0.175EI)

95.3 .023 .998 3804 1.985E-05 7.676E-08 9.834E 05 .453E-02 4.092E-02

CAMERA MOLL NO PAINT IFWP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHOXCKX) TBAR(TO) BETA(TO)  
 TOP(T) 8351  
 SIDE(S) 8063  
 MOLLIDIR 7747

0.0544 2.902E-01 3.3717E-01

PIC NO	TIME DELTME	H(TO)	M(TO)/HREF	M(910)	M(910)/HREF	M(944T0)/HREF	ST(TO)
M 6531(300)	20.42	19.13	4.194E-03	.1709	5.423E-03	.7211	4.798E-03
T 609(300)	20.45	19.16	4.191E-03	.1709	5.420E-03	.7210	4.795E-03
S 4284(300)	20.45	19.16	4.191E-03	.1709	5.420E-03	.7210	4.795E-03
S 4299(300)	21.50	20.21	4.080E-03	.1663	5.277E-03	.2151	4.668E-03
M 6532(300)	21.50	20.21	4.080E-03	.1663	5.277E-03	.2151	4.668E-03
T 610(300)	21.52	20.23	4.078E-03	.1662	5.274E-03	.2150	4.665E-03
T 611(300)	22.58	21.29	3.976E-03	.1621	5.142E-03	.2096	4.549E-03
S 4290(300)	22.58	21.29	3.976E-03	.1621	5.142E-03	.2096	4.549E-03
M 6533(300)	22.58	21.29	3.976E-03	.1621	5.142E-03	.2096	4.549E-03
T 612(300)	23.65	22.36	3.879E-03	.1581	5.017E-03	.2044	4.438E-03
S 4291(300)	23.65	22.36	3.879E-03	.1581	5.017E-03	.2044	4.438E-03
M 6534(300)	23.65	22.36	3.879E-03	.1581	5.017E-03	.2044	4.438E-03
T 613(300)	25.38	24.09	3.737E-03	.1524	4.833E-03	.1971	4.276E-03
M 6535(300)	25.38	24.09	3.737E-03	.1524	4.833E-03	.1971	4.276E-03
S 4292(300)	25.40	24.11	3.735E-03	.1522	4.831E-03	.1969	4.274E-03
M 6536(300)	27.41	26.11	3.589E-03	.1452	4.642E-03	.1891	4.106E-03
T 614(300)	27.43	26.14	3.588E-03	.1462	4.640E-03	.1891	4.105E-03
S 4293(300)	27.43	26.14	3.588E-03	.1462	4.640E-03	.1891	4.105E-03
M 6537(300)	29.43	28.14	3.458E-03	.1408	4.472E-03	.1821	3.956E-03
T 615(300)	29.46	28.17	3.456E-03	.1409	4.470E-03	.1821	3.954E-03
S 4294(300)	29.46	28.17	3.456E-03	.1408	4.470E-03	.1821	3.954E-03
T 616(300)	31.49	30.19	3.338E-03	.1359	4.317E-03	.1758	3.819E-03
S 4295(300)	31.49	30.19	3.338E-03	.1359	4.317E-03	.1758	3.819E-03
M 6538(300)	31.49	30.19	3.338E-03	.1359	4.317E-03	.1758	3.819E-03
T 617(300)	33.51	32.22	3.231E-03	.1316	4.179E-03	.1702	3.697E-03
S 4296(300)	33.51	32.22	3.231E-03	.1316	4.179E-03	.1702	3.697E-03
M 6539(300)	33.51	32.22	3.231E-03	.1316	4.179E-03	.1702	3.697E-03

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NASA-RI ORBITER HEATING  
 AEDC(ARO, INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL R

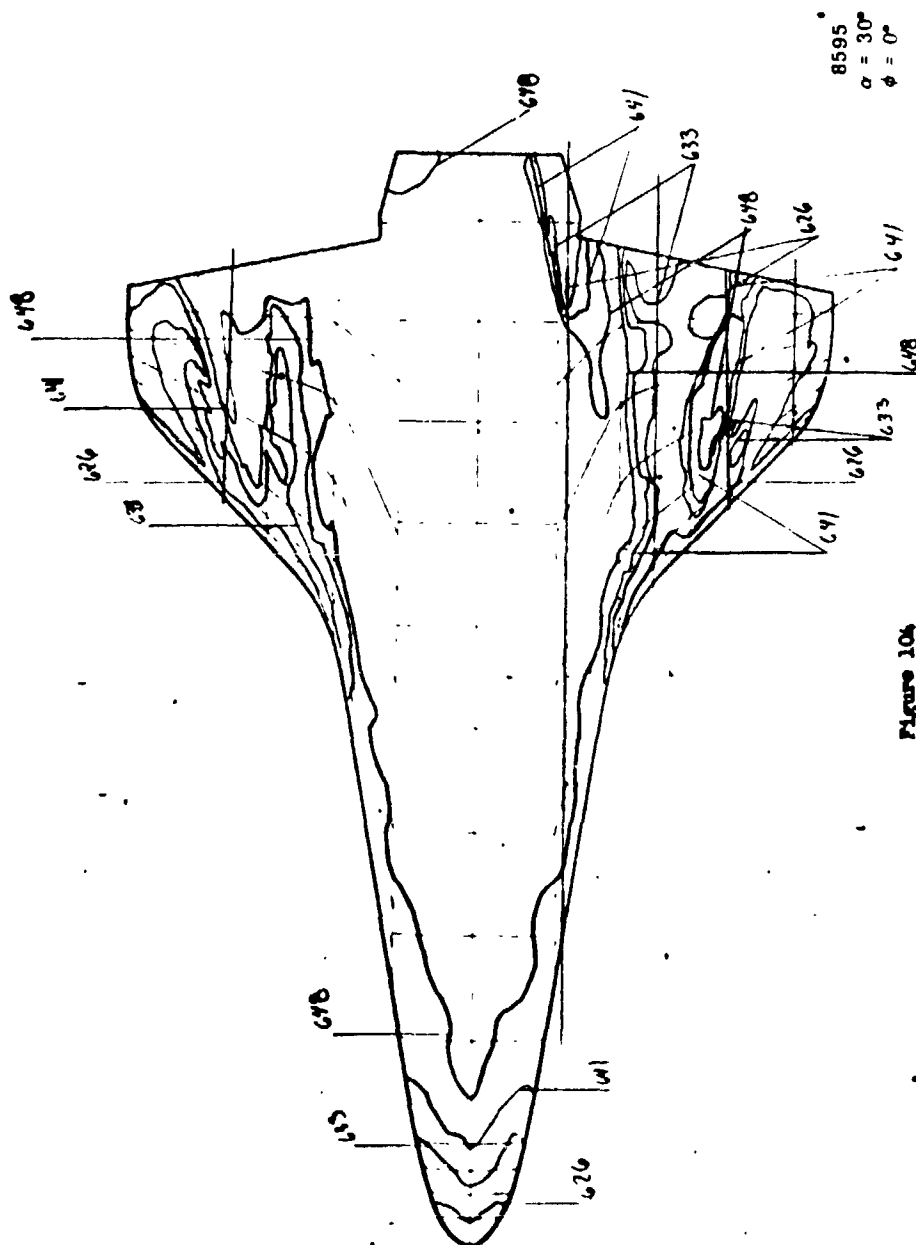
GROUP CONFID MODEL MACH NO P0(PSTA) T0(DEG R) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREBEND ROLL-MODEL YAW  
 89 7 ORBITER R4 7.95 211.8 1301 44.85 -14.85 -30.00 -180.00 -0.00  
 T-INF P-INF Q-INF V-INF MU-INF RE/FT HREF STREF  
 (DEG R) (PSTA) (FT/SEC) (SLUGS/FT<sup>3</sup>) (LB-SEC/FT<sup>2</sup>) (FT-1) (R= .0175FT) (R= .0175FT)  
 94.3 .023 1.000 3804 1.988E-05 7.676F-08 9.852E 05 2.456E-02 4.088E-02  
 CAMERA ROLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHOXCNK) YBAR(TO) BETA(TO)  
 TOP(IT) 8351  
 SIDE(S) 8663  
 NO TIC (IR) 7747  
 .0544 2.902E-01 3.3717E-01

PIC NO TIME DELTIME H(TO) H(TO)/HREF H(1.910) H(1.910)/HREF H(1.944TO) H(1.944TO)/HREF ST(TO)  
 T 618(100) 35.54 34.25 3.134E-03 .1276 4.053E-03 .1451 3.586E-03 .1450 5.125E-03  
 W 640(100) 35.54 34.25 3.134E-03 .1276 4.053E-03 .1451 3.586E-03 .1450 5.125E-03  
 S 4297(100) 35.57 34.27 3.133E-03 .1276 4.052E-03 .1450 3.585E-03 .1459 5.121E-03  
 MODEL HAS LEFT CENTERLINE  
 H 641(100) 36.44 36.28 3.045E-03 .1240 3.938E-03 .1403 3.484E-03 .1418 4.975E-03  
 T 619(100) 37.59 36.36 3.044E-03 .1240 3.937E-03 .1403 3.483E-03 .1418 4.978E-03  
 S 4298(100) 37.59 36.36 3.044E-03 .1240 3.937E-03 .1403 3.483E-03 .1418 4.978E-03  
 T 620(100) 39.62 38.33 2.963E-03 .1206 3.832E-03 .1560 3.390E-03 .1380 4.842E-03  
 S 4299(100) 39.62 38.33 2.963E-03 .1206 3.832E-03 .1560 3.390E-03 .1380 4.842E-03  
 H 642(100) 39.62 38.33 2.963E-03 .1206 3.832E-03 .1560 3.390E-03 .1380 4.842E-03

367

585

Group 90  
8351  
NAD



**Figure 104**



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NASA-RI ORBITER PEATING  
VA249  
AEDC(AH).INC.) ARNOLD AFS, TENNESSEE  
VON KARMAN GAS DYNAMICS FACILITY  
50 INCH HYPERSONIC TUNNEL R

GROUP CONFIG MODEL MACH NO D(PISA) TO(DEC H) ALPHA-MODEL ALPHA-SECTION ALPHA-PREBEND ROLL-MODEL YAW  
90 2 ORBITER S 7.97 425.4 1309 30.02 -0.02 -30.00 -180.00 -0.00

T-INF P-INF Q-INF V-INF RINF MU-INF RF/FT MREF SREF  
(DPA H) (PSIA) (PSIA) (FT/SEC) (SLUGS/FT<sup>3</sup>) (LB-SEC/FT<sup>3</sup>) (FT-LB) (LB-SEC/FT<sup>3</sup>) (IN<sup>2</sup>) (0175EI)  
94.2 1.095 3814 3.723E-05 7.687E-08 1.048 05 3.464E-02 2.912E-02

CAMERA ROLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHOXCK) TRAN(10) RETA(10)  
TOP(1) R251 79 0 0  
SIDE(1) 8063 0 0  
WITCH(1) 7147 0 0

DIC NO TIME RELTIME H(10) H(10)/HREF H(.910) H(.910)/HREF H(.912) H(.912)/HREF H(.912) ST(10)

T 421(100) 1.15 MODEL HAS NOT REACHED CENTERLINE  
M 4543(100) 1.15 MODEL HAS NOT REACHED CENTERLINE  
S 4200(100) 1.18 MODEL HAS NOT REACHED CENTERLINE  
T 4221(100) 2.23 MODEL HAS NOT REACHED CENTERLINE  
M 4201(100) 2.23 MODEL HAS NOT REACHED CENTERLINE  
S 4544(100) 2.23 MODEL HAS NOT REACHED CENTERLINE

INJECT TIME = 2.28

DATA NOT YET VALID  
DATA NOT YET VALID

T	421(100)	3.20	1.031E-02	.2974	1.331E-02	.3938	1.284E-02	.3704	8.500E-03	3
M	4543(100)	4.36	1.031E-02	.2974	1.331E-02	.3938	1.284E-02	.3704	8.500E-03	3
S	4200(100)	4.36	1.031E-02	.2974	1.331E-02	.3938	1.284E-02	.3704	8.500E-03	3
T	4221(100)	4.36	1.031E-02	.2974	1.331E-02	.3938	1.284E-02	.3704	8.500E-03	3
M	4201(100)	4.36	1.031E-02	.2974	1.331E-02	.3938	1.284E-02	.3704	8.500E-03	3
S	4544(100)	4.36	1.031E-02	.2974	1.331E-02	.3938	1.284E-02	.3704	8.500E-03	3
T	4204(100)	5.43	1.031E-02	.2974	1.331E-02	.3938	1.284E-02	.3704	8.500E-03	3
M	4247(100)	5.43	1.031E-02	.2974	1.331E-02	.3938	1.284E-02	.3704	8.500E-03	3
S	4247(100)	5.43	1.031E-02	.2974	1.331E-02	.3938	1.284E-02	.3704	8.500E-03	3
T	4247(100)	6.48	1.031E-02	.2974	1.331E-02	.3938	1.284E-02	.3704	8.500E-03	3
M	4247(100)	6.48	1.031E-02	.2974	1.331E-02	.3938	1.284E-02	.3704	8.500E-03	3
S	4247(100)	6.48	1.031E-02	.2974	1.331E-02	.3938	1.284E-02	.3704	8.500E-03	3
T	4247(100)	7.56	1.031E-02	.2974	1.331E-02	.3938	1.284E-02	.3704	8.500E-03	3
M	4247(100)	7.56	1.031E-02	.2974	1.331E-02	.3938	1.284E-02	.3704	8.500E-03	3
S	4247(100)	7.56	1.031E-02	.2974	1.331E-02	.3938	1.284E-02	.3704	8.500E-03	3
T	4247(100)	8.61	1.031E-02	.2974	1.331E-02	.3938	1.284E-02	.3704	8.500E-03	3
M	4247(100)	8.61	1.031E-02	.2974	1.331E-02	.3938	1.284E-02	.3704	8.500E-03	3
S	4247(100)	8.61	1.031E-02	.2974	1.331E-02	.3938	1.284E-02	.3704	8.500E-03	3
T	4247(100)	9.69	1.031E-02	.2974	1.331E-02	.3938	1.284E-02	.3704	8.500E-03	3
M	4247(100)	9.69	1.031E-02	.2974	1.331E-02	.3938	1.284E-02	.3704	8.500E-03	3
S	4247(100)	9.69	1.031E-02	.2974	1.331E-02	.3938	1.284E-02	.3704	8.500E-03	3

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AEDC (ARO, INC.) ARNOLD AFB, TENNESSEE  
VON KARMAN GAS DYNAMICS FACILITY  
50 INCH HYPERSONIC TUNNEL A

**WASA-HI CRAYER PEYING**

VAZAG

GROUP	CONFID	MODEL	MACW NO	PO(PSIA)	Y(OCEG W)	ALPHA-MODEL	ALPHA-SECTION	ALPHA-PREBEND	ROLL-MODEL	YAW
90	2	CREFTR S	7.97	426.4	1304	30.02	-0.02	-30.00	-180.00	-0.00

	T-INF	P-INF	Q-INF	V-INF	RMO-INF	MU-INF	RF/ET	MAEF	ST/EF
(DEG °)	(PSIA)	(PSIA)	(PSIA)	(FT/SEC)	(SLUGS/FT <sup>3</sup> )	(LB-SEC/FT <sup>2</sup> )	(ET-1)	(R <sub>z</sub> × 0.175ET)	(R <sub>z</sub> × 0.175ET)
95.5	.945	1.990	3814	3.913E-05	7.586E-08	1.953E 06	3.448E-02	2.908E-02	

ROLL NO	PAINT TEMP (DEG F)	INITIAL TEMP (DEG F)	SQUARE ROOT RHQUACAK	TRAR(TO)	PETA(TO)
8251					
TOP(T)					
AC63	300	79	.0544	2.872E-01	3.3248E-01
NICF(S)					
7747					
MOT(MIR)					

PIC NO	TIME	RELTIME	M(TO)	M(TO)/HREF	M(.910)	M(.910)/HREF	M(.912TO)	M(.912TO)/HREF	M(.912TO)	M(.912TO)/HREF	ST(TO)
5	430(100)	9.71	6.299F-03	1.1796	6.019E-03	.2317	7.756E-03	.2236	5.130E-03		
6	431(100)	10.16	6.873F-03	1.1943	7.579E-03	.2195	7.314E-03	.2108	4.836E-03		
7	432(100)	10.74	5.813F-03	1.1693	7.579E-03	.2185	7.314E-03	.2108	4.836E-03		
8	433(100)	10.76	6.573F-03	1.1693	7.579E-03	.2185	7.314E-03	.2108	4.836E-03		
9	434(100)	10.82	5.506F-03	1.1605	7.191E-03	.2073	6.931E-03	.2001	4.589E-03		
10	435(100)	11.64	5.566F-03	1.1605	7.191E-03	.2071	6.931E-03	.1998	4.589E-03		
11	436(100)	11.84	5.506F-03	1.1605	7.191E-03	.2071	6.931E-03	.1998	4.589E-03		
12	437(100)	12.49	5.314F-03	1.1530	6.852E-03	.1975	6.610E-03	.1905	4.370E-03		
13	438(100)	12.49	5.314F-03	1.1530	6.852E-03	.1975	6.610E-03	.1905	4.370E-03		
14	439(100)	12.59	5.043F-03	1.1455	6.524E-03	.1901	6.210E-03	.1905	4.370E-03		
15	440(100)	13.47	5.043F-03	1.1455	6.524E-03	.1901	6.210E-03	.1905	4.370E-03		
16	441(100)	13.57	5.043F-03	1.1455	6.524E-03	.1901	6.210E-03	.1905	4.370E-03		
17	442(100)	15.02	4.840F-03	1.1407	6.291E-03	.1816	6.076E-03	.1752	4.019E-03		
18	443(100)	15.02	4.840F-03	1.1407	6.291E-03	.1816	6.076E-03	.1752	4.019E-03		
19	444(100)	15.62	4.649F-03	1.1354	6.064E-03	.1748	5.852E-03	.1687	3.869E-03		
20	445(100)	16.09	4.649F-03	1.1354	6.064E-03	.1748	5.852E-03	.1687	3.869E-03		
21	446(100)	16.09	4.649F-03	1.1354	6.064E-03	.1748	5.852E-03	.1687	3.869E-03		
22	447(100)	17.14	4.511F-03	1.1309	5.840E-03	.1689	5.654E-03	.1630	3.733E-03		
23	448(100)	17.17	4.511F-03	1.1309	5.840E-03	.1689	5.654E-03	.1630	3.733E-03		
24	449(100)	17.17	4.511F-03	1.1309	5.840E-03	.1689	5.654E-03	.1630	3.733E-03		
25	450(100)	18.22	4.344E-03	1.1267	5.471E-03	.1635	5.472E-03	.1577	3.619E-03		
26	451(100)	18.22	4.344E-03	1.1267	5.471E-03	.1635	5.472E-03	.1577	3.619E-03		
27	452(100)	18.22	4.344E-03	1.1267	5.471E-03	.1635	5.472E-03	.1577	3.619E-03		

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MASA-RI ORBITER PEATING

AEDCIANO, INC.) ARNOLD AFS, TENNESSEE  
VOM KAHMAN GAS DYNAMICS FACILITY  
50 INCH HYPERSONIC TUNNEL R

VA240

GROUP	CNMTG	MODEL	MACH NO	PO(PISA)	IN(IDEG R)	ALPHA-MODEL	ALPHA-SECTOR	ALPHA-PREBEND	ROLL-MODEL	YAW
90	2	ORBITER S	7.97	426.6	1308	30.02	-0.02	-30.00	-100.00	-0.00
T-1AF	P-1AF	Q-1AF	V-1AF	RHO-1AF	MU-1AF	RF/FT	MREF	STREF		
(DEG R)	(PSIA)	(PSIA)	(FT/SEC)	(SLUGS/FT <sup>3</sup> )	(LBS-SEC/FT <sup>2</sup> )	(EI-1)	(R <sub>0</sub> -.0175EI)	(R <sub>0</sub> -.0175EI)		
90.5	0.05	1.901	3014	7.915E-05	7.606E-08	1.954E 06	3.449E-02	2.908E-02		
CAMERA	HOLL NO	PAINT TEMP (DEG F)	INITIAL TEMP (DEG F)	SQUARE ROOT (RHOACXK)	TSAR(TO)	BETA(TO)				
TC0111	8351									
SIDE(S)	8063	300	79	.0544	2.872E-01	3.3248E-01				
MOTICH(R)	7767									

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PIC NO	TIME	DELTIME	M(TO)	M(TO)/MREF	M(-9TO)	MREF	M(-9TO)/MREF	M(-912TO)	MREF	ST(TO)
T 43171001	19.30	19.02	4.201E-03	.1224	5.499E-03	.1585	5.306E-03	.1530	3.509E-03	
S 43171001	19.30	19.02	4.201E-03	.1224	5.499E-03	.1585	5.306E-03	.1530	3.509E-03	
M 44013001	19.20	19.02	4.201E-03	.1224	5.499E-03	.1585	5.306E-03	.1530	3.509E-03	
T 43171001	20.35	19.07	4.142E-03	.1194	5.345E-03	.1541	5.158E-03	.1487	3.409E-03	
M 45611001	20.35	19.07	4.142E-03	.1194	5.345E-03	.1541	5.158E-03	.1487	3.409E-03	
S 43171001	20.37	19.09	4.139E-03	.1193	5.342E-03	.1540	5.154E-03	.1486	3.407E-03	
T 44013001	21.42	20.16	4.030E-03	.1161	5.200E-03	.1499	5.018E-03	.1446	3.316E-03	
S 43171001	21.42	20.16	4.030E-03	.1161	5.200E-03	.1499	5.018E-03	.1446	3.316E-03	
M 45611001	21.42	20.16	4.030E-03	.1161	5.200E-03	.1499	5.018E-03	.1446	3.316E-03	
T 44113001	22.48	21.22	3.926E-03	.1132	5.070E-03	.1461	4.892E-03	.1410	3.234E-03	
S 43201001	22.50	21.22	3.926E-03	.1132	5.070E-03	.1461	4.892E-03	.1410	3.233E-03	
T 44213001	23.55	22.27	3.812E-03	.1105	4.946E-03	.1426	4.772E-03	.1376	3.156E-03	
S 43211001	23.55	22.27	3.812E-03	.1105	4.946E-03	.1426	4.772E-03	.1376	3.156E-03	
M 45611001	23.55	22.27	3.812E-03	.1105	4.946E-03	.1426	4.772E-03	.1376	3.156E-03	
T 44313001	25.10	23.83	3.715E-03	.1068	4.782E-03	.1379	4.614E-03	.1330	3.052E-03	
S 43221001	25.10	23.83	3.715E-03	.1068	4.782E-03	.1379	4.614E-03	.1330	3.052E-03	
M 45651001	25.10	23.83	3.715E-03	.1068	4.782E-03	.1379	4.614E-03	.1330	3.052E-03	
T 44413001	27.13	25.86	3.557E-03	.1026	4.591E-03	.1324	4.430E-03	.1277	2.931E-03	
S 44413001	27.13	25.86	3.557E-03	.1026	4.591E-03	.1324	4.430E-03	.1277	2.931E-03	
M 45661001	27.13	25.86	3.557E-03	.1026	4.591E-03	.1324	4.430E-03	.1277	2.931E-03	
T 44513001	29.16	27.89	3.425E-03	.0988	4.421E-03	.1275	4.266E-03	.1230	2.821E-03	
S 44513001	29.16	27.89	3.425E-03	.0988	4.421E-03	.1275	4.266E-03	.1230	2.821E-03	
M 45671001	29.16	27.89	3.425E-03	.0988	4.421E-03	.1275	4.266E-03	.1230	2.821E-03	
T 44613001	31.19	29.91	3.307E-03	.0954	4.268E-03	.1231	4.116E-03	.1187	2.724E-03	
S 43211001	31.19	29.91	3.307E-03	.0954	4.268E-03	.1231	4.116E-03	.1187	2.724E-03	
M 45681001	31.19	29.91	3.307E-03	.0954	4.268E-03	.1231	4.116E-03	.1187	2.724E-03	

538

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7/10/73

NASA-R1 ORBITER HEATING

AEDC(ARO, INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL R

VA2RQ

GROUP CONFIG MODEL MACH NO P (PSIA) T (DEG R) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREBEND ROLL-MODEL YAW  
 00 2 ORBITER S 7.97 +26.4 1300 30.02 -.02 -30.00 -100.00 -.00

T-1AF P-INF O-INF V-INF MU-INF WE/FT MREF STREF  
 (DEG R) (PSIA) (FT/SEC) (SLUGS/FT<sup>3</sup>) (LR-SEC/FT<sup>2</sup>) (FI-1) (R=.0175FI) (R=.0175FI)  
 95.5 -.045 1.990 3016 3.933E-05 7.845F-08 1.933E 06 3.448E-02 2.908E-02

CAMERA ROLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHO/CAR) TBAR (TO) BETAITO)  
 TOP (T) 0351  
 SIDE (S) 0063  
 BOTTOM (B) 7747  
 300 79 -.0544 2.872E-01 3.3248E-01

PIC NO	TIME DELT (SEC)	M (TO)	M (TO)/MREF	M (TO)	M (TO)/MREF	M (TO)	M (TO)/MREF	ST (TO)
T 4461(100)	31.21	29.01	.0453	4.264E-03	.1230	4.117E-03	.1187	2.724E-01
S 4275(100)	31.21	29.01	.0453	4.264E-03	.1230	4.117E-03	.1187	2.724E-03
T 4324(100)	33.24	31.04	.0423	4.129E-03	.1191	3.984E-03	.1149	2.636E-03
S 4324(100)	33.24	31.04	.0423	4.129E-03	.1191	3.984E-03	.1149	2.636E-03
T 4461(100)	33.24	31.04	.0423	4.129E-03	.1191	3.984E-03	.1149	2.636E-03
S 4327(100)	35.27	33.09	.0495	4.004E-03	.1155	3.863E-03	.1114	2.556E-03
T 4461(100)	35.27	33.09	.0495	4.004E-03	.1155	3.863E-03	.1114	2.556E-03
S 4327(100)	35.27	33.09	.0495	4.004E-03	.1155	3.863E-03	.1114	2.556E-03
MODEL WAS LEFT CENTERLINE								
T 4461(100)	37.29	36.01	.0469	3.849E-03	.1122	3.751E-03	.1093	2.484E-03
S 4324(100)	37.29	36.01	.0469	3.849E-03	.1122	3.751E-03	.1093	2.484E-03
T 4461(100)	39.32	38.04	.0484	3.784E-03	.1092	3.652E-03	.1054	2.416E-03
S 4324(100)	39.32	38.04	.0484	3.784E-03	.1092	3.652E-03	.1054	2.416E-03
T 4461(100)	39.32	38.04	.0484	3.784E-03	.1092	3.652E-03	.1054	2.416E-03
S 4324(100)	39.32	38.04	.0484	3.784E-03	.1092	3.652E-03	.1054	2.416E-03

371

595

Group 91  
79/L  
NO

8595  
 $\sigma = 30^\circ$   
 $\phi = 14^\circ$

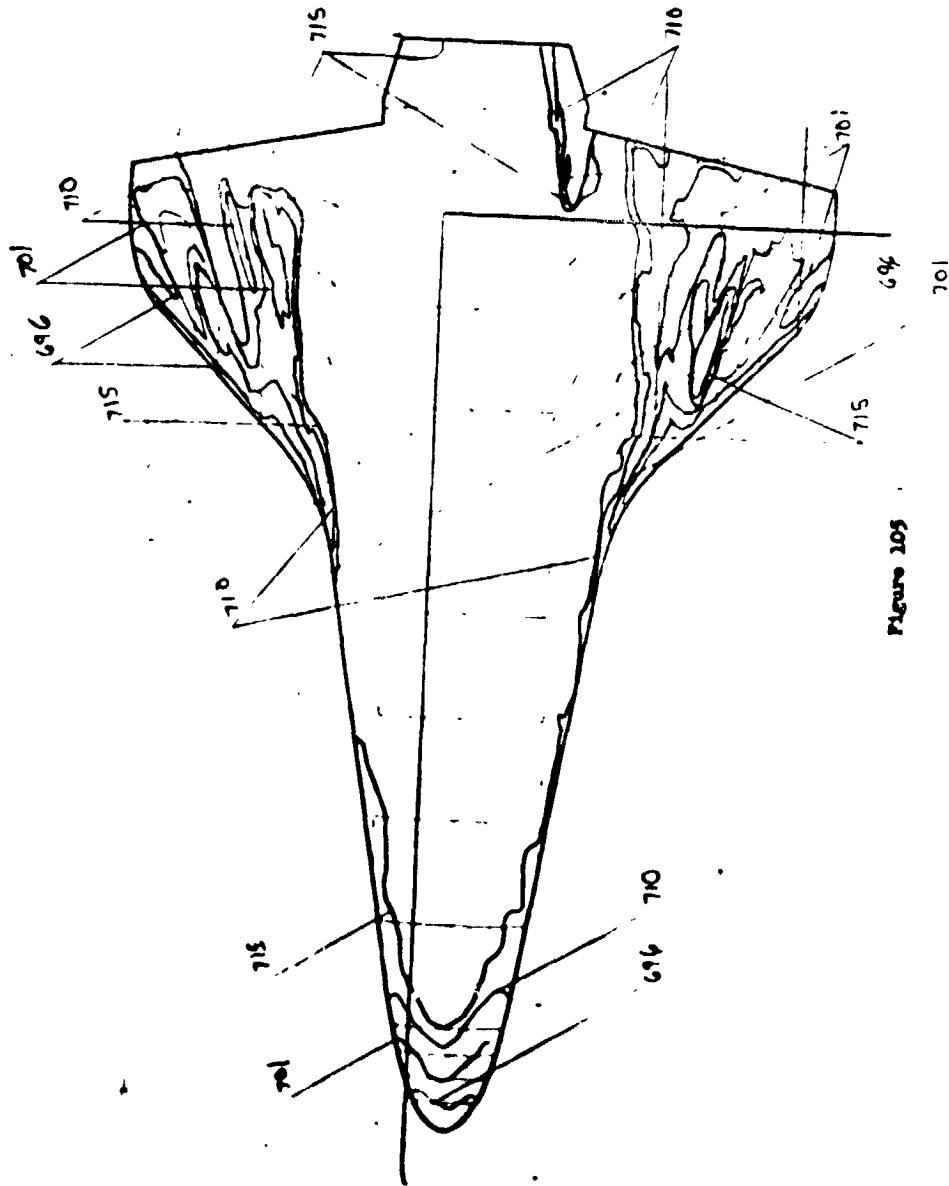


Figure 105



7/10/73

6429A

T=INF	P=INF	Q=INF	R=INF	MU=INF	RE/FT	HREF	STREF
					(F1=1)	(R=-.075FT)	(R=.0175FT)

CAVEIRA	ROLL NO	PAINT TEMP (DEG F)	INITIAL TEMP (DEG F)	SOURCE ROOM (INDICATE)	DATE
TOP(T)	7516	-	20	055A	2-883E-01 3-3420E-01

	PIC NO	TIME	RELTIME	M1T01	M1T01/MREF	M1.9101	M1.9101/MREF	M1.912T01	M1.912T01/MREF	ST(T01)
T	7001(300)	9.74	8.44	6.257E-03	.1903	6.094E-03	.2330	7.802E-03	.2248	5.133E-03
S	4374(300)	9.74	8.44	6.257E-03	.1803	6.094E-03	.2330	7.802E-03	.2248	5.130E-03
S	7701(300)	18.79	9.49	5.900E-03	.1700	7.624E-03	.2197	7.354E-03	.2120	4.838E-03
M	6423(300)	10.79	9.49	5.900E-03	.1700	7.624E-03	.2197	7.354E-03	.2120	4.838E-03
S	4380(300)	10.81	9.52	5.892E-03	.1698	7.616E-03	.2194	7.346E-03	.2117	4.831E-03
T	7021(300)	11.86	10.57	5.542E-03	.1611	7.227E-03	.2042	6.973E-03	.2009	4.584E-03
S	4381(300)	11.86	10.57	5.542E-03	.1611	7.227E-03	.2042	6.973E-03	.2009	4.584E-03
M	6424(300)	11.86	10.57	5.542E-03	.1611	7.227E-03	.2042	6.973E-03	.2009	4.584E-03
M	6425(300)	12.51	11.62	5.333E-03	.1536	6.892E-03	.1986	6.650E-03	.1916	4.372E-03
T	7031(300)	12.54	11.62	5.327E-03	.1535	6.885E-03	.1984	6.643E-03	.1914	4.368E-03
S	4382(300)	12.56	11.65	5.327E-03	.1535	6.885E-03	.1984	6.643E-03	.1914	4.368E-03
T	7047(300)	13.59	12.70	5.102E-03	.1470	6.594E-03	.1900	6.362E-03	.1433	4.185E-03
T	4383(300)	13.59	12.70	5.102E-03	.1470	6.594E-03	.1900	6.362E-03	.1433	4.185E-03
M	6426(300)	13.59	12.70	5.102E-03	.1470	6.594E-03	.1900	6.362E-03	.1433	4.185E-03
T	7051(300)	15.04	13.75	4.593E-03	.1413	6.337E-03	.1826	6.114E-03	.1761	4.020E-03
S	4384(300)	15.04	13.75	4.593E-03	.1413	6.337E-03	.1826	6.114E-03	.1761	4.020E-03
M	6427(300)	15.07	13.77	4.848E-03	.1411	6.331E-03	.1924	6.109E-03	.1760	4.017E-03
T	7067(300)	16.12	14.83	4.722E-03	.1360	6.102E-03	.1758	5.884E-03	.1696	3.870E-03
M	6428(300)	16.12	14.83	4.722E-03	.1360	6.102E-03	.1758	5.884E-03	.1696	3.870E-03
S	4385(300)	16.14	14.85	4.718E-03	.1359	6.097E-03	.1757	5.883E-03	.1695	3.868E-03
T	7077(300)	17.19	15.90	4.559E-03	.1313	5.892E-03	.1698	5.685E-03	.1638	3.737E-03
S	4386(300)	17.19	15.90	4.559E-03	.1313	5.892E-03	.1698	5.685E-03	.1638	3.737E-03
M	6429(300)	17.19	15.90	4.559E-03	.1313	5.892E-03	.1698	5.685E-03	.1638	3.737E-03
M	6430(300)	18.25	16.95	4.015E-03	.1272	5.707E-03	.1644	5.508E-03	.1586	3.619E-03
T	7087(300)	18.27	16.97	4.012E-03	.1271	5.702E-03	.1643	5.502E-03	.1585	3.618E-03
T	4387(300)	18.27	16.98	4.012E-03	.1271	5.702E-03	.1643	5.502E-03	.1585	3.618E-03

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7/10/73

NASA-R1 ORBITER HEATING  
 AFDC(ARO,INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL #

VA293

RRUP CONFIG MODEL MACH NO PO(PSIA) TO( DEG R) ALPHA-MODEL ALPHA-SECTION ALPHA-PREBEND ROLL-MODEL YAW  
 9: 4 ORBITER F1 7.97 427.6 1303 30.00 0 -30.00 -180.00 -0.00  
 T-INF P-INF Q-INF V-INF RHO-INF MU-INF RE/FT HREF STREF  
 (DEG R) (PSIA) (PSIA) (PSIA) (SLUGS/FT<sup>3</sup>) (LH-SEC/FT<sup>2</sup>) (FT-1) (R<sub>2</sub> .0175 FT) (R<sub>2</sub> .0175 FT)  
 95.1 .045 1.995 3908 3.960E-05 7.654E-08 1.970E 06 3.471E-02 2.897E-02  
 CAMERA ROLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHO/CKK) TBAR(10) BETA(10)  
 TOP(1) 7916  
 SIDE(S) 7686  
 MOTICM(8) 8194

PTC NO TIME DELTME H(TO)/HREF H(101)/HREF H(.91210)/HREF H(.91210)/HREF ST(10)  
 M 6631(100) 19.22 18.03 4.262E-03 .1234 5.534E-03 .1595 5.339E-03 .1539 3.507E-03  
 T 7091(100) 19.25 18.05 4.279E-03 .1233 5.530E-03 .1594 5.336E-03 .1538 3.504E-03  
 S 4298(100) 19.25 19.05 4.279E-03 .1233 5.530E-03 .1594 5.336E-03 .1538 3.504E-03  
 T 7101(100) 20.40 19.11 4.159E-03 .1199 5.376E-03 .1549 5.187E-03 .1495 3.410E-03  
 S 4389(100) 20.40 19.11 4.159E-03 .1199 5.376E-03 .1549 5.187E-03 .1495 3.410E-03  
 M 6632(100) 20.40 19.11 4.159E-03 .1199 5.376E-03 .1549 5.187E-03 .1495 3.410E-03  
 M 6633(100) 21.45 20.14 4.049E-03 .1167 5.234E-03 .1509 5.056E-03 .1455 3.320E-03  
 T 7111(100) 21.47 20.14 4.047E-03 .1166 5.230E-03 .1507 5.047E-03 .1454 3.317E-03  
 S 4390(100) 21.47 20.14 4.047E-03 .1166 5.230E-03 .1507 5.047E-03 .1454 3.317E-03  
 T 7121(100) 22.53 21.23 3.945E-03 .1137 5.099E-03 .1469 4.920E-03 .1417 3.233E-03  
 S 4391(100) 22.53 21.23 3.945E-03 .1137 5.099E-03 .1469 4.920E-03 .1417 3.233E-03  
 M 6634(100) 22.53 21.23 3.945E-03 .1137 5.099E-03 .1469 4.920E-03 .1417 3.233E-03  
 M 6635(100) 23.58 22.28 3.851E-03 .1110 4.971E-03 .1434 4.803E-03 .1384 3.157E-03  
 T 7131(100) 23.60 22.31 3.849E-03 .1109 4.975E-03 .1434 4.800E-03 .1383 3.157E-03  
 S 4392(100) 23.60 22.31 3.849E-03 .1109 4.975E-03 .1434 4.800E-03 .1383 3.157E-03  
 T 7141(100) 24.65 23.36 3.761E-03 .1084 4.861E-03 .1401 4.691E-03 .1351 3.083E-03  
 S 4393(100) 24.65 23.36 3.761E-03 .1084 4.861E-03 .1401 4.691E-03 .1351 3.083E-03  
 M 6636(100) 24.65 23.36 3.761E-03 .1084 4.861E-03 .1401 4.691E-03 .1351 3.083E-03  
 M 6637(100) 26.26 24.99 3.639E-03 .1048 4.703E-03 .1355 4.536E-03 .1307 2.983E-03  
 T 7151(100) 26.28 24.99 3.637E-03 .1048 4.701E-03 .1354 4.536E-03 .1307 2.981E-03  
 S 4394(100) 26.28 24.99 3.637E-03 .1048 4.701E-03 .1354 4.536E-03 .1307 2.981E-03  
 MODEL HAS LEFT CENTERLINE  
 M 6638(100) 27.26 26.99 3.499E-03 .1008 4.523E-03 .1303 4.364E-03 .1258 2.870E-03  
 T 7161(100) 28.31 27.01 3.498E-03 .1008 4.521E-03 .1303 4.362E-03 .1257 2.868E-03  
 S 4395(100) 28.31 27.01 3.498E-03 .1008 4.521E-03 .1303 4.362E-03 .1257 2.868E-03

374

584

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Group 92  
79/6-  
NO

8595  
 $\alpha = 30^\circ$   
 $\phi = 0^\circ$

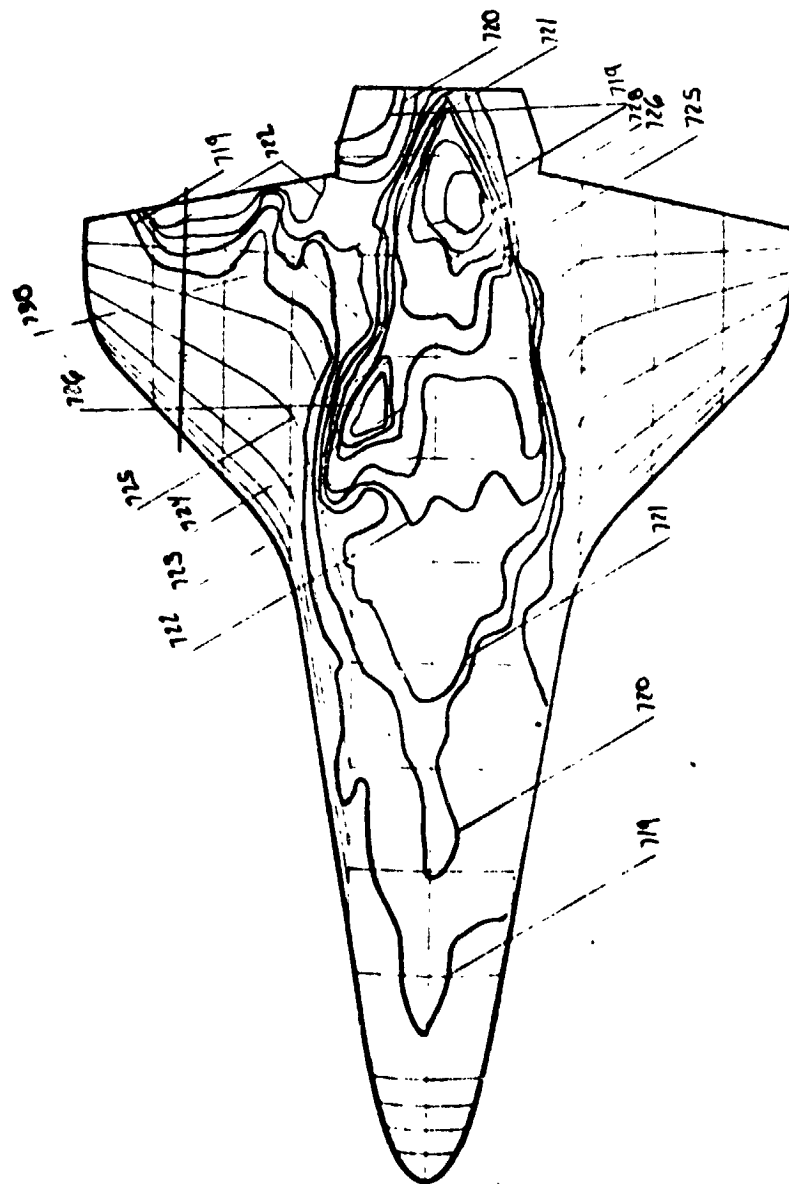


Figure 106

535

Group 92  
7686.  
NO

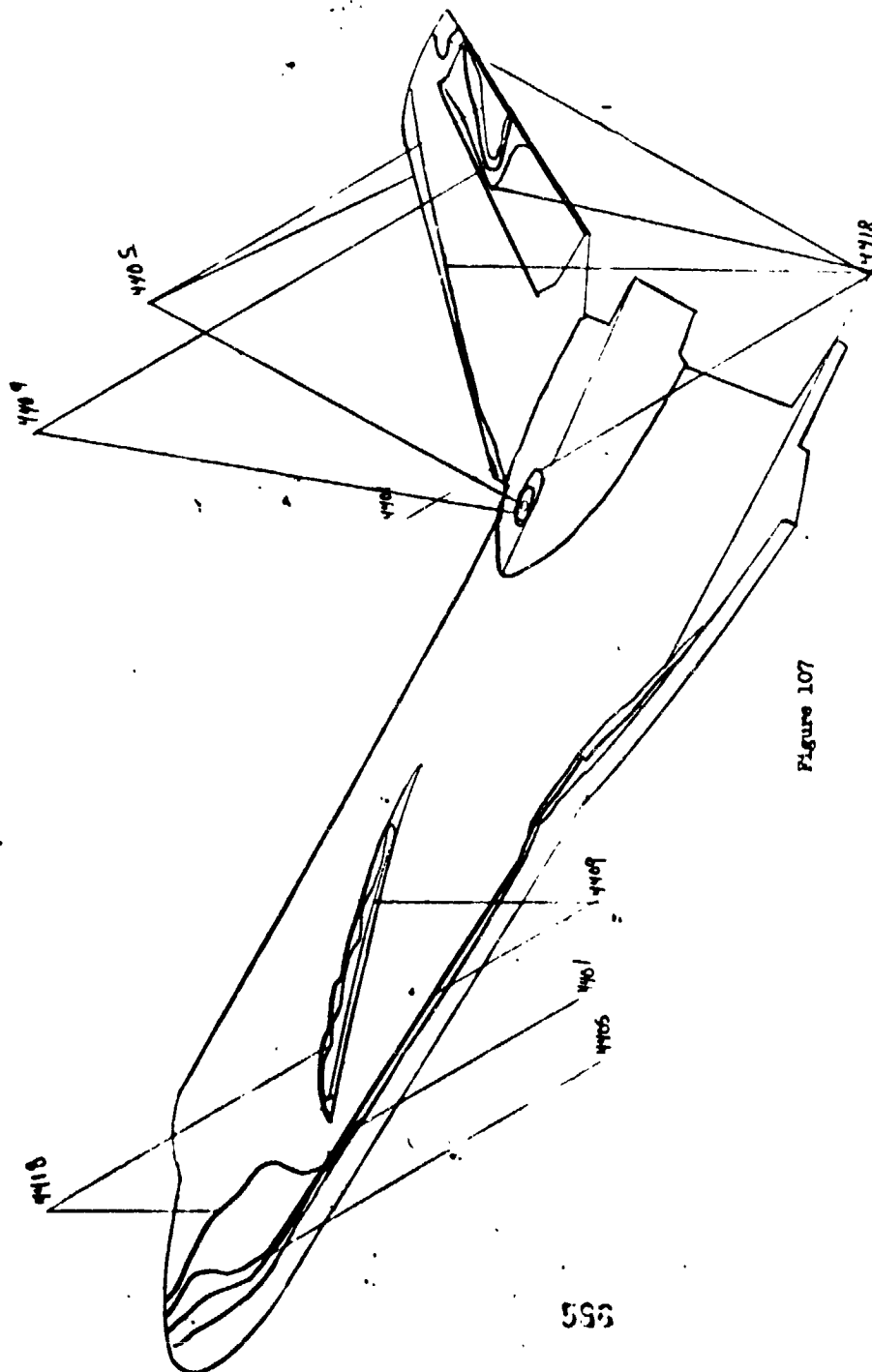


Figure 107

Comp 92  
8194  
10

4528  
 $\alpha = 30^\circ$   
 $\phi = 0^\circ$

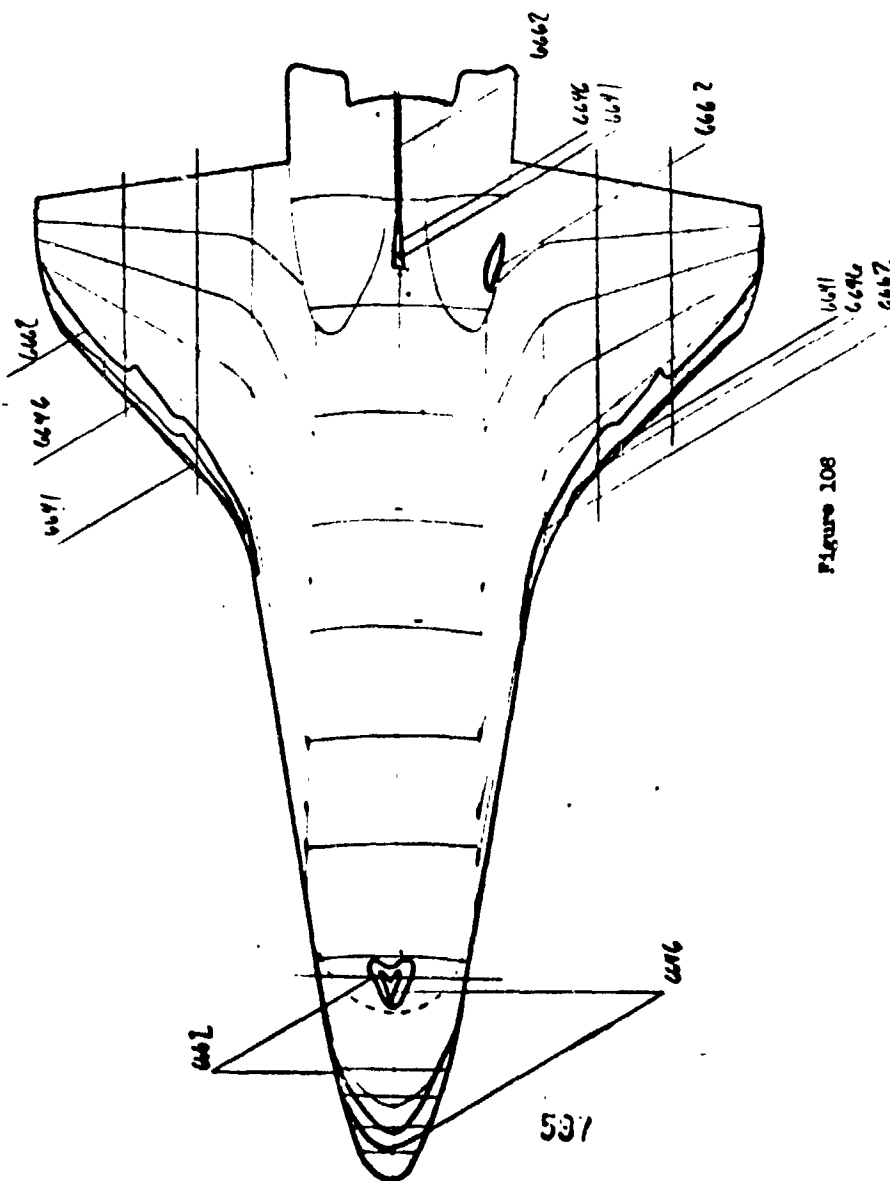


Figure 108

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7/10/73

NASA-RT ORBITER HEATING

AEDC(ARO, INC.) ARNOLD AFS, TENNESSEE  
VON KARMAN GAS DYNAMICS FACILITY  
50 INCH HYPERSONIC TUNNEL R

V2R9

GROUP	CONFID	MODEL	MACH NO	PO(P5IA)	TO(DEC R)	ALPHA-MODEL	ALPHA-SECTION	ALPHA-PREBEND	ROLL-MODEL	YAW
92	2	ORBITER S	7.97	426.2	1294	30.00	0	-30.00	-180.00	--00
T-1AF	P-1NF	Q-1NF	V-1NF	RHO-1NF	MU-1NF	RE/1 T	HREF	S1REF		
(DEG R)	(P5IA)	(FT/SEC)	(FT/SEC)	(SLUGS/FT3)	(LB-SEC/FT2)	(FI-1)	(R= .0175FT)	(R= .0175FT)		
94.8	.845	1.989	3802	3.959E-05	7.632E-08	1.973E 06	3.443E-02	2.897E-02		
CAMFRA		HOLL NO	PAINT TFP (DEG F)	INITIAL TEMP (DEG F)	SQUARE ROOT (RMKCKXK)	TRAR(TO)	BETA(TO)			
TOP(IT)		7916								
SINF(S)		7686	150	80	.0496		0	0		
MOTIMUR		8194								

PIC NO	TIME DELTIME	H(TO)	H(TO)/HREF	H(.910)	H(.910)/HREF	H(.912TO)	H(.912TO)/HREF	ST(TO)
T 717(150)	1.18	MODEL HAS NOT REACHED CENTERLINE						
S 4394(150)	1.18	MODEL HAS NOT REACHED CENTERLINE						
M 6639(150)	1.18	MODEL HAS NOT REACHED CENTERLINE						
M 6640(150)	2.23	MODEL HAS NOT REACHED CENTERLINE						
T 718(150)	2.25	MODEL HAS NOT REACHED CENTERLINE						
S 4397(150)	2.25	MODEL HAS NOT REACHED CENTERLINE						
INJECT TIME *	2.28							
T 719(150)	3.20	DATA NOT YET VALID						
S 4398(150)	3.20	DATA NOT YET VALID						
M 6641(150)	3.20	DATA NOT YET VALID						
T 720(150)	4.28	2.445E-03	.0718	3.048E-03	.0880	2.965E-03	.0856	2.059E-03
S 4399(150)	4.28	2.445E-03	.0718	3.048E-03	.0880	2.965E-03	.0856	2.059E-03
M 6642(150)	4.38	2.445E-03	.0718	3.048E-03	.0880	2.965E-03	.0856	2.059E-03
T 721(150)	5.43	2.142E-03	.0620	2.634E-03	.0761	2.562E-03	.0740	1.778E-03
M 6643(150)	5.43	2.142E-03	.0620	2.634E-03	.0761	2.562E-03	.0740	1.778E-03
S 4400(150)	5.46	2.142E-03	.0618	2.628E-03	.0758	2.554E-03	.0737	1.773E-03
T 722(150)	5.52	1.915E-03	.0553	2.348E-03	.0678	2.283E-03	.0659	1.584E-03
S 4401(150)	5.52	1.915E-03	.0553	2.348E-03	.0678	2.283E-03	.0659	1.584E-03
M 6644(150)	5.52	1.915E-03	.0553	2.348E-03	.0678	2.283E-03	.0659	1.584E-03
T 723(150)	6.28	1.743E-03	.0504	2.142E-03	.0618	2.043E-03	.0601	1.445E-03
M 6645(150)	6.28	1.743E-03	.0503	2.138E-03	.0617	2.079E-03	.0600	1.443E-03
S 4402(150)	7.58	1.743E-03	.0503	2.138E-03	.0617	2.079E-03	.0600	1.443E-03
T 724(150)	8.63	1.614E-03	.0466	1.979E-03	.0571	1.925E-03	.0556	1.336E-03
S 4403(150)	8.63	1.614E-03	.0466	1.979E-03	.0571	1.925E-03	.0556	1.336E-03
M 6646(150)	8.63	1.614E-03	.0466	1.979E-03	.0571	1.925E-03	.0556	1.336E-03
T 725(150)	9.71	1.508E-03	.0435	1.849E-03	.0534	1.798E-03	.0519	1.247E-03
S 4404(150)	9.71	1.508E-03	.0435	1.849E-03	.0534	1.798E-03	.0519	1.247E-03
M 6647(150)	9.71	1.508E-03	.0435	1.849E-03	.0534	1.798E-03	.0519	1.247E-03

375

538

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NASA-RI ORBITER HEATING AEDC(ARO,INC.) ARNOLD AFS, TENNESSEE  
VON KARMAN GAS DYNAMICS FACILITY  
50 INCH HYPERSONIC TUNNEL R

7/10/73

UNCLASSIFIED

GROUP CONFIG MODEL MACH NO PO(PSTA) TO(DEG R) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREBEND ROLL-MODEL YAW  
92 2 ORBITER S 7.97 426.6 1298 30.00 0 -30.00 -180.00 -0.00

T-INF P-INF O-INF V-INF RMO-INF MU-INF RE/FT MREF SREF  
(DEG R) (PSTA) (FT/SEC) (SLUGS/FT<sup>3</sup>) (LR-SEC/FT<sup>2</sup>) (FI-1) (R<sup>2</sup> .0175FI) (R<sup>2</sup> .0175FI)  
94.7 .045 1.991 3801 3.945E-05 7.629E-08 1.976E 06 3.444E-02 2.895E-02

CAMERA ROLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHOCCK) TRAR(TO) BETAI(TO)  
TOP(T) 7916  
SIDE(S) 7486  
MOTIC(M) 8194

375

PIC NO	TIME DELTIME	H(TO)	H(TO)/HREF	H(.9TO)	H(.9TO)/HREF	H(.912TO)	H(.912TO)/HREF	ST(TO)
M 6648(150)	10.76	9.40	1.422E-03	.0410	1.743E-03	.0503	1.695E-03	.0489
T 724(150)	10.79	9.51	1.420E-03	.0410	1.741E-03	.0502	1.693E-03	.0489
S 4405(150)	10.79	9.51	1.420E-03	.0410	1.741E-03	.0502	1.693E-03	.0489
T 727(150)	11.84	10.54	1.347E-03	.0389	1.652E-03	.0477	1.607E-03	.0464
S 4406(150)	11.84	10.54	1.347E-03	.0389	1.652E-03	.0477	1.607E-03	.0464
M 6649(150)	11.84	10.54	1.347E-03	.0389	1.652E-03	.0477	1.607E-03	.0464
M 6650(150)	12.89	11.61	1.245E-03	.0371	1.575E-03	.0455	1.532E-03	.0442
T 728(150)	12.91	11.64	1.243E-03	.0370	1.574E-03	.0454	1.530E-03	.0442
S 4407(150)	12.91	11.64	1.243E-03	.0370	1.574E-03	.0454	1.530E-03	.0442
T 729(150)	13.57	12.69	1.229E-03	.0355	1.507E-03	.0435	1.468E-03	.0423
M 6651(150)	13.57	12.69	1.229E-03	.0355	1.507E-03	.0435	1.468E-03	.0423
S 4408(150)	13.59	12.71	1.228E-03	.0354	1.506E-03	.0434	1.467E-03	.0423
T 730(150)	15.04	13.74	1.140E-03	.0340	1.447E-03	.0417	1.407E-03	.0406
S 4409(150)	15.04	13.74	1.140E-03	.0340	1.447E-03	.0417	1.407E-03	.0406
M 6652(150)	15.04	13.74	1.140E-03	.0340	1.447E-03	.0417	1.407E-03	.0406
T 731(150)	16.09	14.81	1.137E-03	.0328	1.395E-03	.0402	1.356E-03	.0391
S 4410(150)	16.12	14.84	1.136E-03	.0328	1.394E-03	.0402	1.355E-03	.0391
T 732(150)	17.17	15.89	1.048E-03	.0317	1.347E-03	.0389	1.310E-03	.0378
S 4411(150)	17.17	15.89	1.048E-03	.0317	1.347E-03	.0389	1.310E-03	.0378
M 6653(150)	17.17	15.89	1.048E-03	.0317	1.347E-03	.0389	1.310E-03	.0378
T 733(150)	18.25	16.97	1.043E-03	.0307	1.303E-03	.0376	1.267E-03	.0366
S 4412(150)	18.25	16.97	1.043E-03	.0307	1.303E-03	.0376	1.267E-03	.0366
M 6654(150)	19.30	18.02	1.031E-03	.0298	1.265E-03	.0365	1.230E-03	.0355
T 734(150)	19.30	18.02	1.031E-03	.0298	1.265E-03	.0365	1.230E-03	.0355
S 4413(150)	19.30	18.02	1.031E-03	.0298	1.265E-03	.0365	1.230E-03	.0355

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AEDC(ARO-INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH BYPASSES 1C TUNNEL R

NASA-R1 ORBITER HEATING

VA289

GROUP CNF16 MODEL MACH NO PO(P5IA) TO(DEG R) ALPHA-MODEL ALPHA-SECTION ALPHA-PREEND ROLL-MODEL YAW  
 92 2 ORBITER S 7.97 427.1 1298 30.00 0 -30.00 -180.00 -0.00  
 T-INF P-INF Q-INF V-INF MU-INF RHO-INF HE/FT MREF SREF  
 (DEG R) (PSIA) (FT/SEC) (SLUGS/FT3) (LB-SEC/FT2) (FI-1) (R=0.175FI) (R=0.175FI)  
 9.7 0.45 1.903 3R00 3.071E-05 7.625E-08 1.479E 06 3.446E-02 2.892E-02  
 CAMERA ROLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHO/CXK) TBAR(TO) BETA(TO)  
 TOP(T) 7916  
 VINE(S) 7686  
 MOUTCH(B) 8189  
 9.227E-02 8.0263E-02  
 0.0496

377

PTC NO	TIME DELTIME	H(TO)/HREF	H(0.9TO)	H(0.9TO)/HREF	H(0.912TO)	H(0.912TO)/HREF	ST(TO)
S 4413(150)	19.32	1.031E-03	0.297	1.264E-03	1.229E-03	0.355	8.513E-04
S 4414(150)	20.37	1.002E-03	0.289	1.229E-03	1.195E-03	0.345	8.273E-04
M 6457(150)	20.37	1.802E-03	0.289	1.229E-03	1.195E-03	0.345	8.273E-04
T 735(150)	20.40	1.001E-03	0.289	1.229E-03	1.194E-03	0.344	8.271E-04
M 6458(150)	21.42	9.71E-04	0.281	1.194E-03	1.163E-03	0.335	8.054E-04
T 736(150)	21.45	9.749E-04	0.281	1.194E-03	1.162E-03	0.335	8.053E-04
S 4415(150)	21.45	9.749E-04	0.281	1.194E-03	1.162E-03	0.335	8.053E-04
T 737(150)	22.50	9.503E-04	0.274	1.165E-03	1.133E-03	0.327	7.853E-04
M 6459(150)	22.50	9.503E-04	0.274	1.165E-03	1.133E-03	0.327	7.853E-04
S 4416(150)	22.53	9.477E-04	0.274	1.165E-03	1.133E-03	0.327	7.853E-04
T 738(150)	23.58	9.271E-04	0.267	1.137E-03	1.106E-03	0.319	7.657E-04
S 4417(150)	23.58	9.271E-04	0.267	1.137E-03	1.106E-03	0.319	7.657E-04
M 6460(150)	23.58	9.271E-04	0.267	1.137E-03	1.106E-03	0.319	7.657E-04
T 739(150)	25.43	8.949E-04	0.257	1.092E-03	1.062E-03	0.306	7.357E-04
S 4418(150)	25.43	8.949E-04	0.257	1.092E-03	1.062E-03	0.306	7.357E-04
M 6461(150)	26.15	8.909E-04	0.257	1.092E-03	1.062E-03	0.306	7.357E-04
T 740(150)	27.46	8.556E-04	0.247	1.049E-03	1.020E-03	0.294	7.065E-04
S 4419(150)	27.46	8.556E-04	0.247	1.049E-03	1.020E-03	0.294	7.065E-04
M 6462(150)	27.46	8.556E-04	0.247	1.049E-03	1.020E-03	0.294	7.065E-04
MODEL HAS LEFT CENTERLINE							
T 741(150)	29.48	8.243E-04	0.234	1.011E-03	9.830E-04	0.284	6.805E-04
S 4420(150)	29.48	8.243E-04	0.234	1.011E-03	9.830E-04	0.284	6.805E-04
M 6463(150)	29.48	8.243E-04	0.234	1.011E-03	9.830E-04	0.284	6.805E-04

Group 93  
7686  
MV

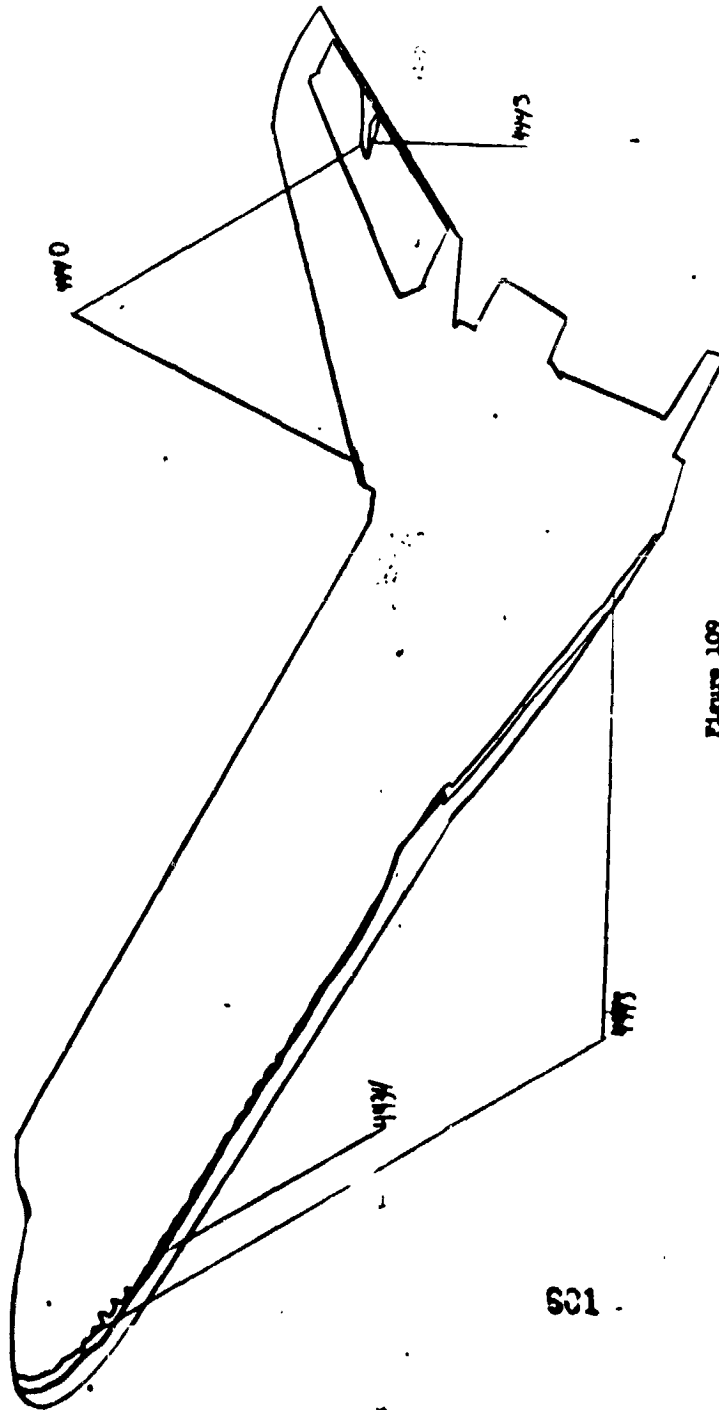
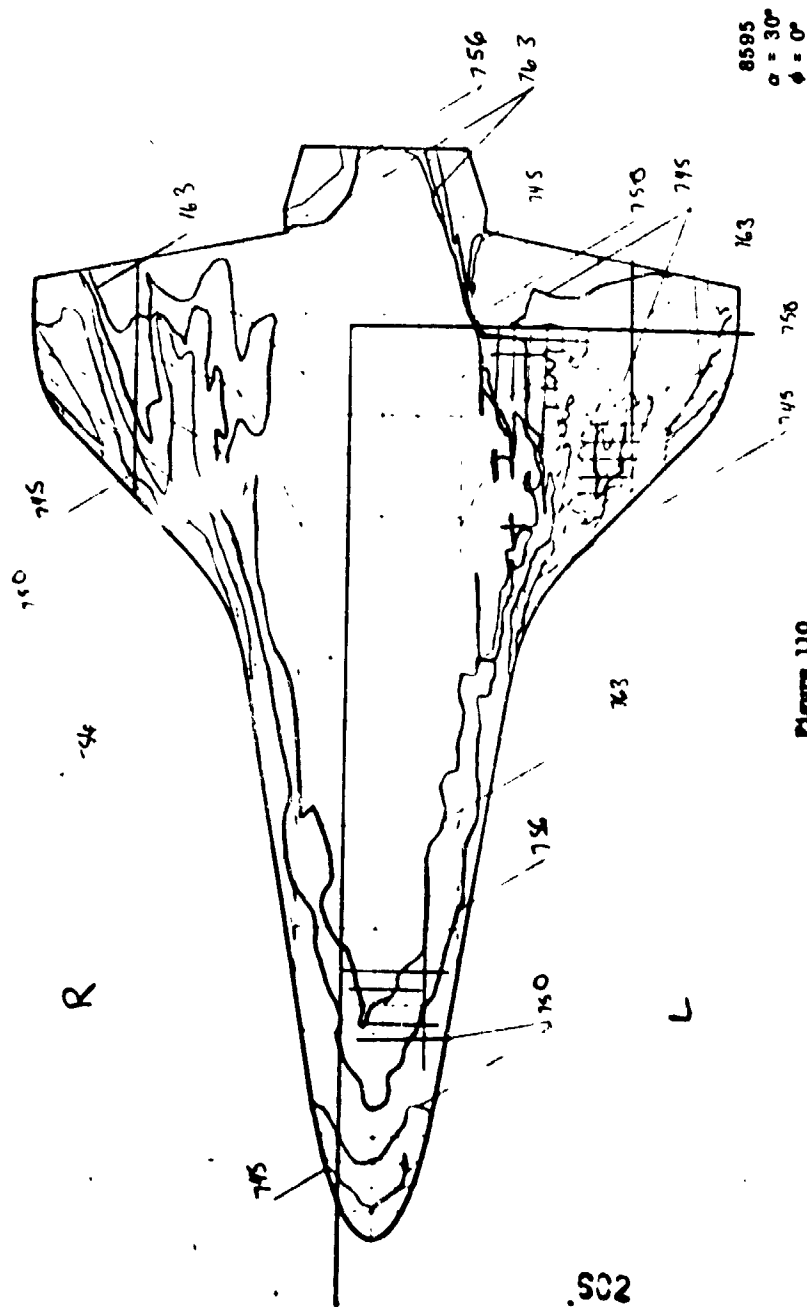


Figure 109



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NASA-R1 ORBITER PEATING AEDC(ARO, INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL M

VA290

GROUP COMPIG MODEL MACH NO PR(PISA) TO(NEG R) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREBEND ROLL-MODEL YAW  
 93 5 ORBITER 85 7.97 425.9 1257 30.00 .00 -30.00 -180.00 --00

T-INF Q-INF V-INF RHO-INF MU-INF PE/FT HREF STREF  
 (DEG R) (PSIA) (PSIA) (SLUGS/FT) (LB-SEC/FT) (FT-LB) (R=0.175EI) (R=0.175EI)

90.6 .045 1.902 3799 3.902E-05 7.620E-08 1.976E 06 3.441E-02 2.895E-02

CAPRA ROLL NO PAINT (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHOXCK) TBAHITO) BETA(10)

TOP(1) 7616 250 .0535 0 0

MCITC(19) 8194

PIC NO TIME RELTIME H(10) H(10)/HREF H(10) H(10)/HREF H(10) H(10)/HREF ST(10)

M 4664(250) 1-15 MODEL HAS NOT REACHED CENTERLINE

T 742(250) 1-18 MODEL HAS NOT REACHED CENTERLINE

S 4621(250) 1-18 MODEL HAS NOT REACHED CENTERLINE

M 4664(250) 2-23 MODEL HAS NOT REACHED CENTERLINE

T 743(250) 2-25 MODEL HAS NOT REACHED CENTERLINE

S 4622(250) 2-25 MODEL HAS NOT REACHED CENTERLINE

INJECT TIME 2.28

T 744(250) 3-20 DATA NOT YET VALID

M 4664(250) 3-20 DATA NOT YET VALID

S 4623(250) 3-23 DATA NOT YET VALID

T 745(250) 4-28 3-19 7.467E-03 .2154 9.441E-03 .2732 9.157E-03 .2644 6.144E-03 .2644

M 4624(250) 4-28 3-19 7.467E-03 .2154 9.441E-03 .2732 9.157E-03 .2644 6.144E-03 .2644

T 746(250) 5-43 4-15 6.453E-03 .1462 9.176E-03 .2340 7.913E-03 .2284 5.308E-03 .2284

M 4664(250) 5-43 4-15 6.453E-03 .1462 9.176E-03 .2340 7.913E-03 .2284 5.308E-03 .2284

T 747(250) 5-46 4-18 6.434E-03 .1454 9.152E-03 .2354 7.809E-03 .2278 5.293E-03 .2278

M 4625(250) 5-46 4-18 6.434E-03 .1454 9.152E-03 .2354 7.809E-03 .2278 5.293E-03 .2278

T 748(250) 6-51 5-23 5.751E-03 .1600 7.286E-03 .2104 7.052E-03 .2036 4.731E-03 .2036

M 4626(250) 6-51 5-23 5.751E-03 .1600 7.286E-03 .2104 7.052E-03 .2036 4.731E-03 .2036

T 749(250) 6-51 5-23 5.751E-03 .1600 7.286E-03 .2104 7.052E-03 .2036 4.731E-03 .2036

M 6669(250) 6-51 5-23 5.751E-03 .1600 7.286E-03 .2104 7.052E-03 .2036 4.731E-03 .2036

T 750(250) 7-54 6-31 6.237E-03 .1512 6.634E-03 .1854 6.422E-03 .1854 4.308E-03 .1854

M 6670(250) 7-54 6-31 6.237E-03 .1512 6.634E-03 .1854 6.422E-03 .1854 4.308E-03 .1854

T 751(250) 8-63 7-34 4.844E-03 .1408 6.143E-03 .1773 5.445E-03 .1716 3.908E-03 .1716

M 6671(250) 8-63 7-34 4.844E-03 .1408 6.143E-03 .1773 5.445E-03 .1716 3.908E-03 .1716

T 752(250) 8-63 7-34 4.844E-03 .1408 6.143E-03 .1773 5.445E-03 .1716 3.908E-03 .1716

M 6672(250) 8-63 7-34 4.844E-03 .1408 6.143E-03 .1773 5.445E-03 .1716 3.908E-03 .1716

T 753(250) 9-71 8-43 4.524E-03 .1307 5.734E-03 .1656 5.553E-03 .1603 3.724E-03 .1603

M 6673(250) 9-71 8-43 4.524E-03 .1307 5.734E-03 .1656 5.553E-03 .1603 3.724E-03 .1603

T 754(250) 9-71 8-43 4.524E-03 .1307 5.734E-03 .1656 5.553E-03 .1603 3.724E-03 .1603

M 6674(250) 9-71 8-43 4.524E-03 .1307 5.734E-03 .1656 5.553E-03 .1603 3.724E-03 .1603

T 755(250) 9-71 8-43 4.524E-03 .1307 5.734E-03 .1656 5.553E-03 .1603 3.724E-03 .1603

M 6675(250) 9-71 8-43 4.524E-03 .1307 5.734E-03 .1656 5.553E-03 .1603 3.724E-03 .1603

T 756(250) 9-71 8-43 4.524E-03 .1307 5.734E-03 .1656 5.553E-03 .1603 3.724E-03 .1603

M 6676(250) 9-71 8-43 4.524E-03 .1307 5.734E-03 .1656 5.553E-03 .1603 3.724E-03 .1603

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7/10/73

NASA-R1 WRITER FEATING  
 AFDC(AHO, INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL W

VA209

GROUP CNF16 MODEL MACH NO P(PSIA) T(DEG R) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREBEND ROLL-MODEL YAW

93 5 ORBITER B5 7.97 426.7 1297 30.00 .00 -30.00 -100.00 -.00

T-INF P-INF Q-INF Y-INF MU-INF RMU-INF RE/FI MREF SREF

(DEG R) (PSIA) (PSIA) (PSIA) (SLUGS/FT<sup>3</sup>) (LB-SEC/FT<sup>2</sup>) (FT/SEC) (RPM) (RPM) (RPM) (RPM)

64.7 .045 1.001 3800 3.069E-05 7.622E-06 1.979E-04 3.444E-02 2.893E-02

CAMERA WOLL NO PAINT IFMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHO/CH) TBAH(TO) BETA(TO)

TOP(T) 7916 78 0.535 2.265E-01 2.4579E-01

NOISE(M) 8194

QIC NO	TIME DELTIME	M(10)	M(10)/MREF	M(.910)	M(.910)/MREF	M(.912)	M(.912)/MREF	ST(10)
W 4673(250)	10.76 9.48	4.270E-03	.1232	5.410E-03	.1561	5.236E-03	.1511	3.510E-03
T 7511(250)	10.79 9.51	4.264E-03	.1231	5.403E-03	.1560	5.229E-03	.1509	3.507E-03
S 4930(250)	10.79 9.51	4.254E-03	.1231	5.403E-03	.1560	5.229E-03	.1509	3.507E-03
T 7521(250)	11.04 10.54	4.047E-03	.1168	5.127E-03	.1480	4.962E-03	.1432	3.326E-03
W 4674(250)	11.04 10.54	4.047E-03	.1168	5.127E-03	.1480	4.962E-03	.1432	3.326E-03
T 7531(250)	11.06 10.54	4.042E-03	.1166	5.121E-03	.1478	4.956E-03	.1430	3.322E-03
S 4631(250)	11.06 10.54	4.042E-03	.1166	5.121E-03	.1478	4.956E-03	.1430	3.322E-03
T 7531(250)	12.51 11.64	3.855E-03	.1112	4.884E-03	.1409	4.727E-03	.1364	3.169E-03
S 4631(250)	12.51 11.64	3.855E-03	.1112	4.884E-03	.1409	4.727E-03	.1364	3.169E-03
W 4674(250)	12.51 11.64	3.855E-03	.1112	4.884E-03	.1409	4.727E-03	.1364	3.169E-03
T 7541(250)	13.07 12.60	3.622E-03	.1065	4.678E-03	.1350	4.527E-03	.1306	3.035E-03
S 4633(250)	13.07 12.71	3.604E-03	.1064	4.673E-03	.1349	4.523E-03	.1305	3.032E-03
T 7541(250)	13.50 13.71	3.564E-03	.1064	4.673E-03	.1349	4.523E-03	.1305	3.032E-03
S 4633(250)	13.50 13.74	3.564E-03	.1064	4.673E-03	.1349	4.523E-03	.1305	3.032E-03
T 7541(250)	15.04 13.74	3.544E-03	.1023	4.691E-03	.1296	4.347E-03	.1254	2.913E-03
S 4634(250)	15.04 13.74	3.544E-03	.1023	4.691E-03	.1296	4.347E-03	.1254	2.913E-03
T 7541(250)	15.04 13.74	3.544E-03	.1023	4.691E-03	.1296	4.347E-03	.1254	2.913E-03
S 4634(250)	15.04 13.74	3.544E-03	.1023	4.691E-03	.1296	4.347E-03	.1254	2.913E-03
T 7541(250)	16.12 14.04	3.414E-03	.0985	4.325E-03	.1248	4.106E-03	.1208	2.806E-03
S 4635(250)	16.12 14.04	3.414E-03	.0985	4.325E-03	.1248	4.106E-03	.1208	2.806E-03
T 7541(250)	16.12 14.04	3.414E-03	.0985	4.325E-03	.1248	4.106E-03	.1208	2.806E-03
S 4635(250)	16.12 14.04	3.414E-03	.0985	4.325E-03	.1248	4.106E-03	.1208	2.806E-03
T 7541(250)	17.17 15.89	3.249E-03	.0952	4.180E-03	.1206	4.045E-03	.1167	2.710E-03
S 4636(250)	17.17 15.89	3.249E-03	.0952	4.180E-03	.1206	4.045E-03	.1167	2.710E-03
T 7541(250)	17.19 15.93	3.249E-03	.0951	4.176E-03	.1205	4.042E-03	.1166	2.708E-03
S 4637(250)	17.19 15.93	3.249E-03	.0951	4.176E-03	.1205	4.042E-03	.1166	2.708E-03
T 7541(250)	18.25 16.97	3.142E-03	.0921	4.045E-03	.1167	3.915E-03	.1129	2.622E-03
S 4637(250)	18.25 16.97	3.142E-03	.0921	4.045E-03	.1167	3.915E-03	.1129	2.622E-03
T 7541(250)	18.25 16.97	3.142E-03	.0921	4.045E-03	.1167	3.915E-03	.1129	2.622E-03
S 4638(250)	18.25 16.97	3.142E-03	.0921	4.045E-03	.1167	3.915E-03	.1129	2.622E-03
T 7541(250)	19.20 18.02	3.044E-03	.0894	3.925E-03	.1132	3.799E-03	.1096	2.544E-03

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AEDC(AMN,INC.) ARNOLD AFS, TENNESSEE  
 VOM KAHAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL W

WASO-MI ORBITER HEATING  
 VAS200

GROUP CMMF16 MODEL MACH NO M(PSIA) T(IDEG R) ALPHA-MODEL ALPHA-SECTION ALPHI-PREBEND RWLL-MODEL YAW  
 91 5 04111FM 25 7.97 427.3 1248 30.00 .00 -30.00 -180.00 -.00

T-1AF 0-1AF 0-1AF V-1AF RNN-1AF MU-1AF WF/PT MREF SIMPS  
 (DEG R) (PSIA) (FT/SEC) (SLUGS/FT<sup>3</sup>) (LBS-SEC/FT<sup>2</sup>) (FJ-1) (R-0175FI) (M-0175FI)

66.7 .045 1.996 3000 7.623F-05 7.623F-04 1.981E 04 3.472E-02 2.891C-02

CAMERA ROLL NO PAINT IFMP (DEG F) INITIAL TEMP (IDEG F) SQUARE ROOT (RHO/CAR) TBRN(TO) DEYAT(TO)  
 TOP(T) 7516  
 SIG(FSI) 7686 250 .0535 2.265E-01 2.4579E-01  
 MOT(FHIN) 8194

PIC NO	TYPE	MELTIME	M(TO)	M(TO)/MREF	M(-91TO)	M(-912TO)/MREF	M(-912TO)	ST(TO)	
1	750(250)	19.32	1.046F-73	.0493	3.922E-03	.1132	3.796E-03	.1095	2.544E-03
5	662(250)	19.32	1.046F-73	.0493	3.922E-03	.1132	3.796E-03	.1095	2.544E-03
W	662(250)	20.27	1.046F-73	.0493	3.922E-03	.1132	3.796E-03	.1095	2.544E-03
1	760(250)	20.40	1.046F-73	.0493	3.922E-03	.1132	3.796E-03	.1095	2.544E-03
5	662(250)	20.40	1.046F-73	.0493	3.922E-03	.1132	3.796E-03	.1095	2.544E-03
W	662(250)	21.45	2.028F-73	.0444	3.710E-03	.1070	3.590E-03	.1036	2.404E-03
1	761(250)	21.45	2.028F-73	.0444	3.710E-03	.1070	3.590E-03	.1036	2.404E-03
5	662(250)	21.47	2.028F-73	.0444	3.710E-03	.1070	3.590E-03	.1036	2.404E-03
W	662(250)	21.47	2.028F-73	.0444	3.710E-03	.1070	3.590E-03	.1036	2.404E-03
1	762(250)	22.53	2.028F-73	.0444	3.710E-03	.1070	3.590E-03	.1036	2.404E-03
5	662(250)	22.53	2.028F-73	.0444	3.710E-03	.1070	3.590E-03	.1036	2.404E-03
W	662(250)	22.53	2.028F-73	.0444	3.710E-03	.1070	3.590E-03	.1036	2.404E-03
1	763(250)	23.60	2.028F-73	.0444	3.710E-03	.1070	3.590E-03	.1036	2.404E-03
5	662(250)	23.60	2.028F-73	.0444	3.710E-03	.1070	3.590E-03	.1036	2.404E-03
W	662(250)	23.60	2.028F-73	.0444	3.710E-03	.1070	3.590E-03	.1036	2.404E-03
1	764(250)	24.63	2.028F-73	.0444	3.710E-03	.1070	3.590E-03	.1036	2.404E-03
5	662(250)	24.63	2.028F-73	.0444	3.710E-03	.1070	3.590E-03	.1036	2.404E-03
W	662(250)	24.63	2.028F-73	.0444	3.710E-03	.1070	3.590E-03	.1036	2.404E-03
1	765(250)	25.68	2.028F-73	.0444	3.710E-03	.1070	3.590E-03	.1036	2.404E-03
5	662(250)	25.68	2.028F-73	.0444	3.710E-03	.1070	3.590E-03	.1036	2.404E-03
W	662(250)	25.68	2.028F-73	.0444	3.710E-03	.1070	3.590E-03	.1036	2.404E-03
1	766(250)	26.68	2.028F-73	.0444	3.710E-03	.1070	3.590E-03	.1036	2.404E-03
5	662(250)	26.68	2.028F-73	.0444	3.710E-03	.1070	3.590E-03	.1036	2.404E-03
W	662(250)	26.68	2.028F-73	.0444	3.710E-03	.1070	3.590E-03	.1036	2.404E-03
1	767(250)	27.70	2.028F-73	.0444	3.710E-03	.1070	3.590E-03	.1036	2.404E-03
5	662(250)	27.70	2.028F-73	.0444	3.710E-03	.1070	3.590E-03	.1036	2.404E-03
W	662(250)	27.70	2.028F-73	.0444	3.710E-03	.1070	3.590E-03	.1036	2.404E-03

Group 94  
no  
7686

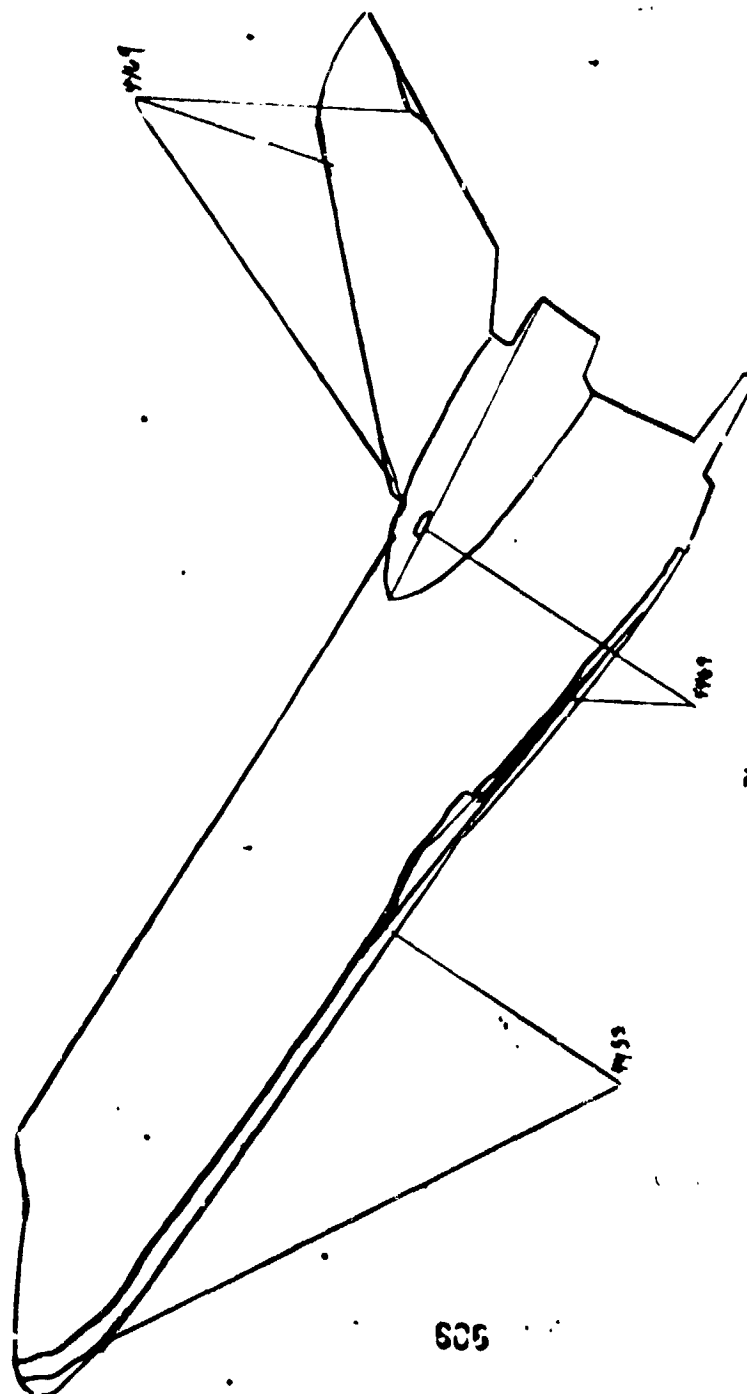
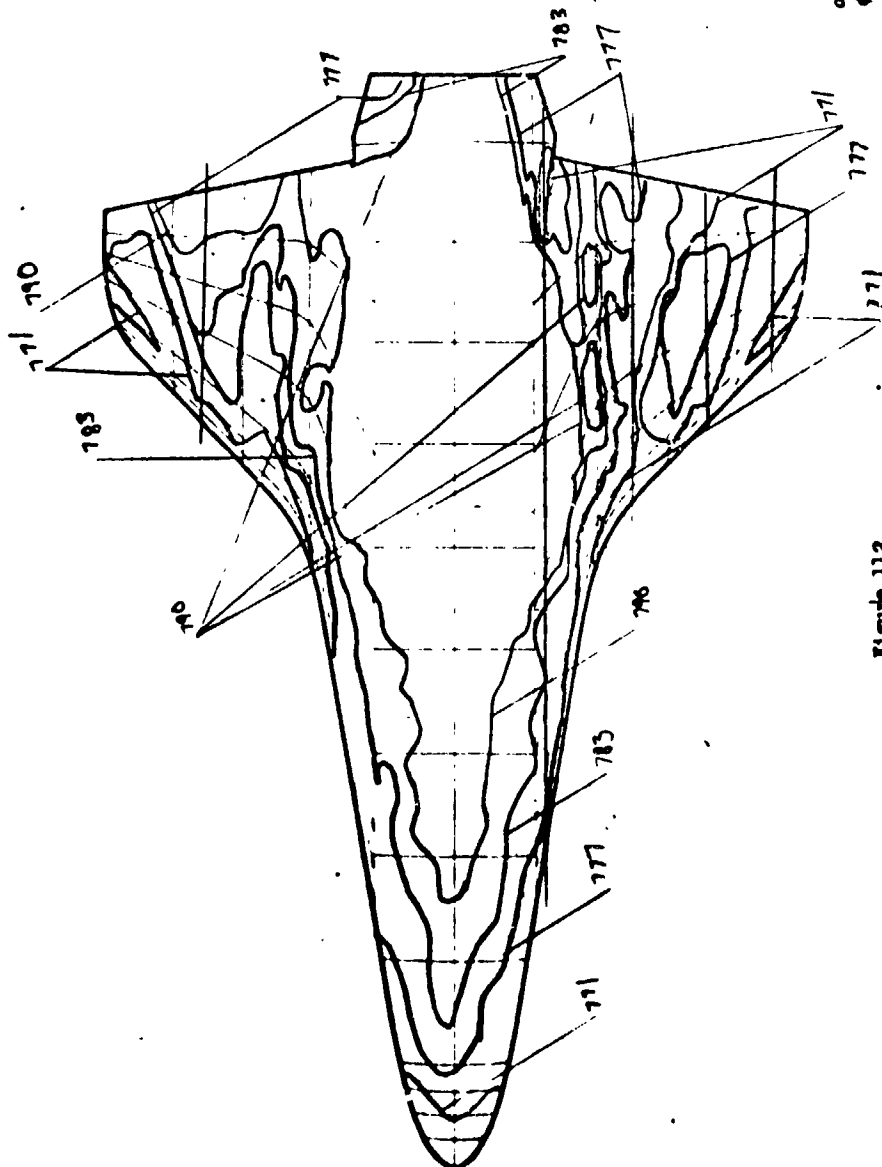


Figure 111

Comp 94  
7916  
no



8595  
 $\alpha = 30^\circ$   
 $\phi = 0^\circ$

Figure 112

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 \* UNCLASSIFIED \*  
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7/10/73

NASA-RI ORBITER PEATING

AEDCIARO, INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL R

VA289

GROUP CONF16 MODEL MACH NO PO(PSIA) TO(DEG R) ALPHA-MODEL ALPHA-SECTION ALPHA-PREMEMO ROLL-MODEL YAW  
 94 2 ORBITER S 7.97 425.0 1304 30.00 .00 -30.00 -180.00 -.00  
 T-TAF P-INF Q-INF R-INF MU-INF W-INF STREF  
 (DEG R) (PSIA) (SEC) (SLUGS/FT<sup>3</sup>) (LBS-SEC/FT<sup>2</sup>) (FT-L) (R= .0175ET) (R= .0175ET)  
 95.2 .045 1.9R3 3810 3.933E-05 7.661F-08 1.956E 06 3.461E-02 2.908E-02  
 CAMERA ROLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHOACAK) TBAR(TO) BETAT(O)  
 TOP(T) 7916  
 SIDE(S) 7686  
 MOTIC(M) 8194 250 77 .0535 0 0

PIC NO TIME DELTIVE HIT(O) HIT(O)/HREF HI(.910) HREF HI(.912TO) HI(.912TO)/HREF ST(TO)  
 T 767(250) 1.18 MODEL HAS NOT REACHED CENTERLINE HI(.910) HREF HI(.912TO) HI(.912TO)/HREF ST(TO)  
 S 4446(250) 1.18 MODEL HAS NOT REACHED CENTERLINE  
 M 6699(250) 1.18 MODEL HAS NOT REACHED CENTERLINE  
 T 764(250) 2.25 MODEL HAS NOT REACHED CENTERLINE  
 S 4447(250) 2.25 MODEL HAS NOT REACHED CENTERLINE  
 M 6690(250) 2.25 MODEL HAS NOT REACHED CENTERLINE  
 INJECT TIME = 2.30  
 T 7691(250) 3.30 DATA NOT YET VALID  
 S 4448(250) 3.30 DATA NOT YET VALID  
 T 770(250) 4.38 7.442E-03 9.413E-03 .2719 9.113E-03 .2632 9.113E-03 6.154E-03  
 M 6692(250) 4.38 7.442E-03 9.413E-03 .2719 9.113E-03 .2632 9.113E-03 6.154E-03  
 S 4449(250) 4.41 7.412E-03 9.375E-03 .2707 9.076E-03 .2621 9.076E-03 6.127E-03  
 T 771(250) 5.46 4.408E-03 8.105E-03 .2340 7.847E-03 .2266 7.847E-03 5.296E-03  
 S 4450(250) 5.46 4.41E-03 8.105E-03 .2340 7.847E-03 .2266 7.847E-03 5.296E-03  
 M 6693(250) 5.46 4.41E-03 8.105E-03 .2340 7.847E-03 .2266 7.847E-03 5.296E-03  
 T 772(250) 6.51 5.713E-03 7.225E-03 .2091 7.012E-03 .2024 7.012E-03 4.731E-03  
 S 4451(250) 6.53 5.713E-03 7.225E-03 .2091 7.012E-03 .2024 7.012E-03 4.731E-03  
 T 773(250) 7.58 5.213E-03 6.594E-03 .1904 6.993E-03 .2020 6.993E-03 4.721E-03  
 S 4452(250) 7.58 5.213E-03 6.594E-03 .1904 6.993E-03 .2020 6.993E-03 4.721E-03  
 M 6694(250) 7.58 5.213E-03 6.594E-03 .1904 6.993E-03 .2020 6.993E-03 4.721E-03  
 T 774(250) 8.66 4.819E-03 6.093E-03 .1759 6.384E-03 .1843 6.384E-03 4.308E-03  
 S 4453(250) 8.66 4.819E-03 6.093E-03 .1759 6.384E-03 .1843 6.384E-03 4.308E-03  
 M 6695(250) 8.66 4.819E-03 6.093E-03 .1759 6.384E-03 .1843 6.384E-03 4.308E-03  
 T 775(250) 9.71 4.507E-03 5.700E-03 .1646 5.519E-03 .1593 5.519E-03 3.724E-03  
 S 4454(250) 9.71 4.507E-03 5.700E-03 .1646 5.519E-03 .1593 5.519E-03 3.724E-03  
 M 6696(250) 9.71 4.507E-03 5.700E-03 .1646 5.519E-03 .1593 5.519E-03 3.724E-03

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UNCLASSIFIED  
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7/19/73

NASA-B1 ORBITER PEATING  
AEDC(ARO, INC.) ARNOLD AFS, TENNESSEE  
VOM KARMAN GAS DYNAMICS FACILITY  
50 INCH HYPERSONIC TUNNEL W

VA299

GROUP CAMEL6 MODEL MACH NO PO(PSIA) TO(IDEG R) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREBEND ROLL-MODEL YAW  
94 2 ORBITER S 7.97 426.3 1304 30.00 .00 -30.00 -180.00 --.00

T-1MF P-1MF Q-1MF V-1MF MU-1MF MU-1MF RE/FT MREF SREF  
IDEG R (PSIA) (FT/SEC) (SLUGS/FT3) (LB-SEC/FT2) (FI-1) (R=.0175FI) (R=.0175FI)  
95.2 .005 1.969 3810 7.63F-08 1.961E 06 3.446E-02 2.904E-02

CAMERA ROLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHOCAC) TRAR(TOI) BETA(TOI)  
TOP(TI) 7914  
SIDE(S) 7486 250  
HOT(TCHIB) 8194 .0535 2.255E-01 2.4442E-01

PIC NO	TIME DELTME	T(TOI)	M(TOI)/MREF	M(.910I)/MREF	M(.912TO)/MREF	ST(TOI)
S 4662(250)	18.20	3.171E-03	.0915	4.011E-03	.1157	3.083E-03
T 784(250)	19.35	3.077E-03	.0888	3.892E-03	.1123	3.768E-03
M 4706(250)	19.35	3.077E-03	.0888	3.892E-03	.1123	3.768E-03
S 4663(250)	19.37	3.075E-03	.0887	3.890E-03	.1122	3.766E-03
T 785(250)	20.42	2.940E-03	.0863	3.781E-03	.1091	3.661E-03
S 4664(250)	20.42	2.940E-03	.0863	3.781E-03	.1091	3.661E-03
M 4707(250)	20.42	2.940E-03	.0863	3.781E-03	.1091	3.661E-03
S 4665(250)	21.47	2.911E-03	.0848	3.691E-03	.1062	3.562E-03
T 786(250)	21.50	2.809E-03	.0839	3.579E-03	.1042	3.562E-03
M 4708(250)	21.50	2.809E-03	.0839	3.579E-03	.1042	3.562E-03
T 787(250)	22.55	2.846E-03	.0816	3.547E-03	.1035	3.473E-03
M 4709(250)	22.55	2.846E-03	.0816	3.547E-03	.1035	3.473E-03
S 4666(250)	22.58	2.846E-03	.0816	3.547E-03	.1035	3.473E-03
T 788(250)	23.63	2.747E-03	.0798	3.505E-03	.1010	3.384E-03
S 4667(250)	23.63	2.747E-03	.0798	3.505E-03	.1010	3.384E-03
M 4710(250)	23.63	2.747E-03	.0798	3.505E-03	.1010	3.384E-03
T 789(250)	24.70	2.703E-03	.0780	3.414E-03	.0986	3.309E-03
S 4668(250)	24.70	2.703E-03	.0780	3.414E-03	.0986	3.309E-03
M 4711(250)	24.70	2.703E-03	.0780	3.414E-03	.0986	3.309E-03
T 790(250)	26.61	2.599E-03	.0750	3.287E-03	.0948	3.183E-03
S 4669(250)	26.61	2.599E-03	.0750	3.287E-03	.0948	3.183E-03
M 4712(250)	26.61	2.599E-03	.0750	3.287E-03	.0948	3.183E-03
T 791(250)	28.63	2.501E-03	.0721	3.153E-03	.0912	3.062E-03
S 4670(250)	28.63	2.501E-03	.0721	3.153E-03	.0912	3.062E-03
M 4713(250)	28.63	2.501E-03	.0721	3.153E-03	.0912	3.062E-03
T 791(250)	28.66	2.500E-03	.0721	3.152E-03	.0912	3.061E-03
S 4670(250)	28.66	2.500E-03	.0721	3.152E-03	.0912	3.061E-03

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UNCLASSIFIED  
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7/10/73

NASA-RI ORBITER HEATING AEDC(ARO) INC., ARNOLD AFS, TENNESSEE  
VON KARMAN GAS DYNAMICS FACILITY  
50 INCH HYPERSONIC TUNNEL R  
VA289

GROUP COMFIG MODEL MACH NO PO(PSTA) TO( DEG P) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREBEND ROLL-MODEL YAW  
94 2 ORBITER S 7.97 426.5 1304 30.00 .00 -30.00 -180.00 -.00  
T-INF P-INF Q-INF V-INF MU-INF RMO-INF RE/FT HREF STREF  
(DEG R) (PSTA) (PSTA) (FT/SEC) (SLUGS/FT<sup>3</sup>) (LB-SEC/FT<sup>2</sup>) (FT-L) (R= .0175FT) (R= .0175FT)  
95.2 -.045 1.990 1810 3.944E-05 7.663E-08 1.962E 06 3.447E-02 2.903E-02  
CAMERA ROLL NO PAINT (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHO/CAL) TRAR(TO) BETA(TO)  
TOPIT 7914  
SIDF(S) 7686 250 .0535 2.255E-01 2.4442E-01  
MOTTC(M(R) 8194

PIC NO TIME DELTIME H(TO) M(TO)/HREF M(.910) M(.910)/HREF M(.91210) M(.91210)/HREF ST(TO)  
29.08  
T 792(250) 30.69 29.39 2.412E-03 3.051E-03 .0880 2.953E-03 .0852 1.989E-03  
S 4471(250) 30.69 29.39 2.412E-03 3.051E-03 .0880 2.953E-03 .0852 1.989E-03  
R 6714(250) 30.69 29.39 2.412E-03 3.051E-03 .0880 2.953E-03 .0852 1.989E-03

384

611

Group 95  
7916  
100

E 1100 F2

8585  
 $\alpha = 30^\circ$   
 $\phi = 0^\circ$

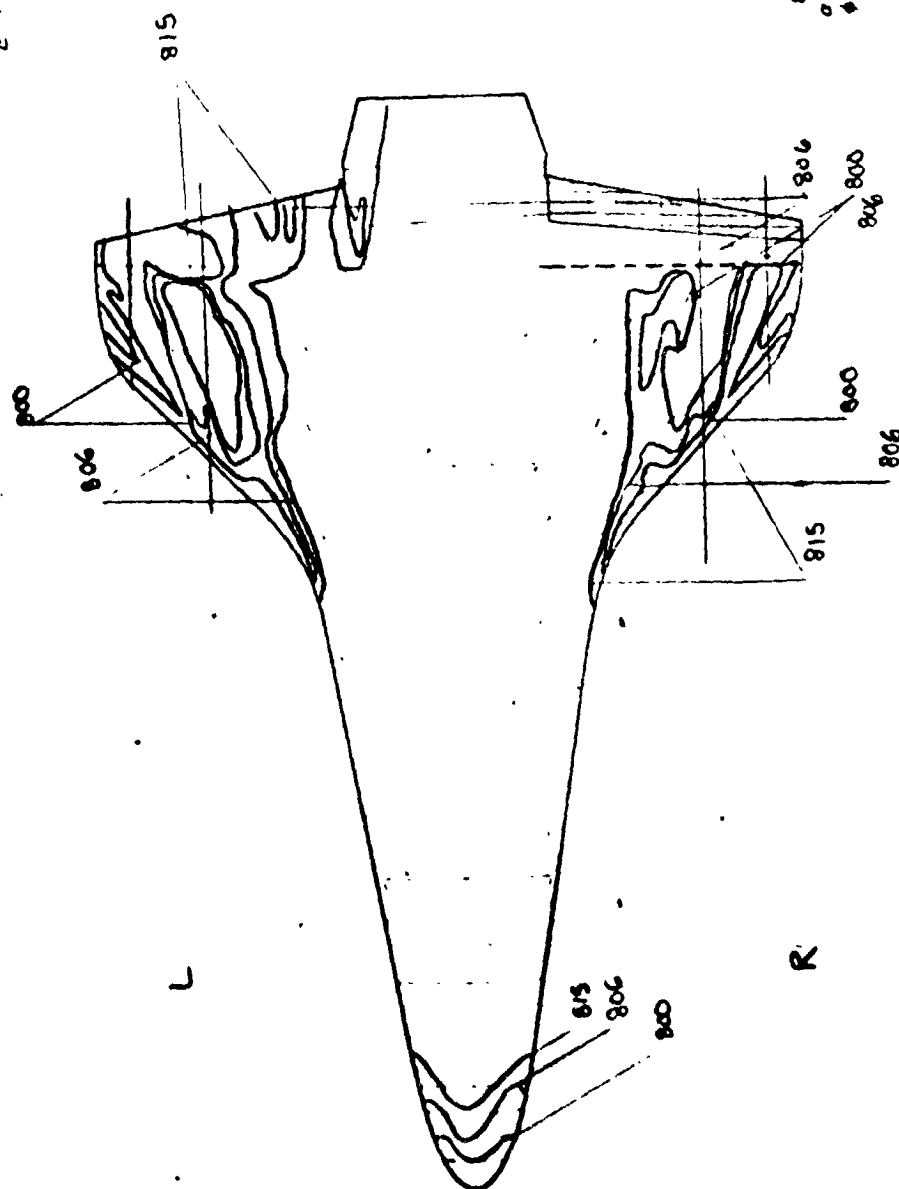


Figure 119

Group 95  
8194  
108

E model

4528  
 $\alpha = 30^\circ$   
 $\phi = 0^\circ$

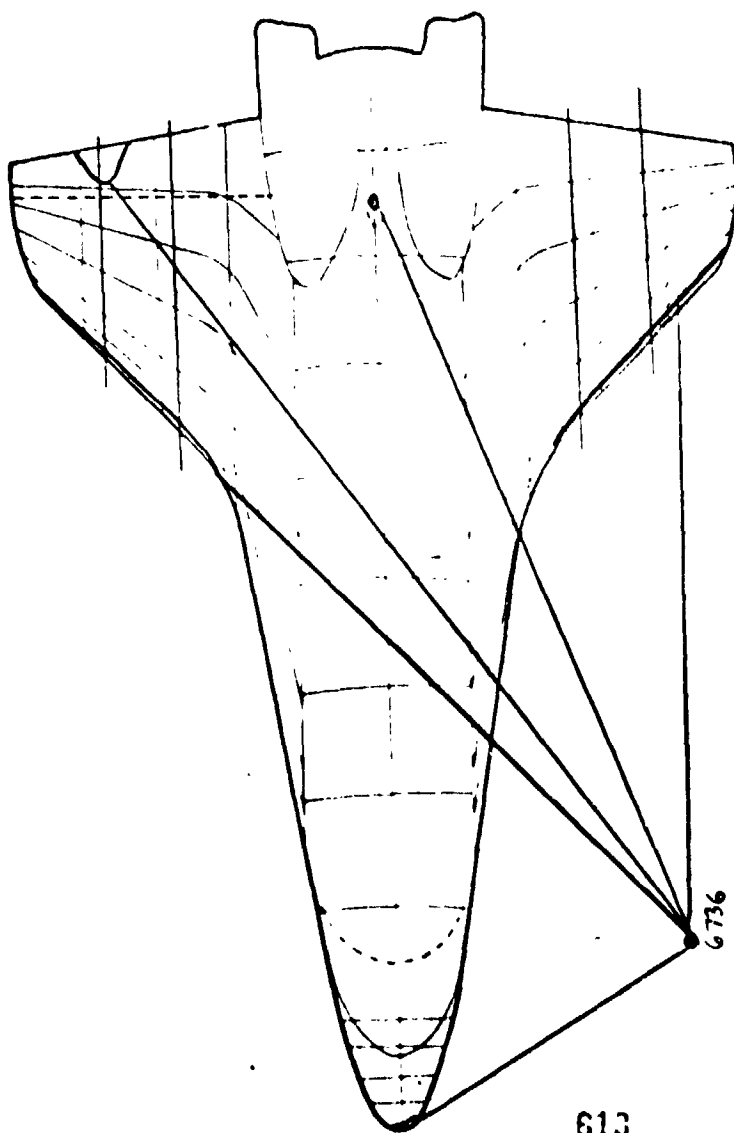


Figure 114



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UNCLASSIFIED  
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7/10/73

NASA-RE ORBITER HEATING  
AFDC(AHO, INC.) ARNOLD AFS, TENNESSEE  
VON KARMAN GAS DYNAMICS FACILITY  
50 INCH HYPERSONIC TUNNEL R

VAPR9

GROUP CONFIG MODEL MACH NO  $\rho$ (PSIA)  $T_0$ (DEG R) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREBEND ROLL-MODEL YAW  
95 1 ORBITER E 7.97 424.9 1307 30.00 .00 -30.00 -180.00 -0.00

T-INF P-INF Q-INF V-INF RMU-INF MU-INF RE/FT MREF SREF  
(DEG R) (PSIA) (PSIA) (FT/SEC) (SLUGS/FT<sup>3</sup>) (LB-SEC/FT<sup>2</sup>) (FT-LB) (LB-SEC/FT<sup>2</sup>) (IN<sup>2</sup>-LB/SEC<sup>2</sup>)  
95.7 .045 1.943 3813 3.074E-05 7.676E-08 1.949E 04 3.461E-02 2.911E-02

CAMERA MOLL NO PAINT IFWP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHOXCKX) TRAR(TO) BETA(TO)  
TOP(T) 7516 78  
SIDE(S) 7686 350  
MOTICM(R) 8194 .0550 3.539E-01 4.4314E-01

PIC NO	TYPE	DELTIME	M(TO)	MREF	M(.910)	MREF	M(.912)	MREF	M(.912)	MREF	ST(TO)
S 4481(150)	10.01	9.52	7.899E-03	7.899E-03	1.047E-02	1.047E-02	1.005E-02	1.005E-02	1.005E-02	1.005E-02	6.506E-03
T 402(150)	10.04	9.54	7.899E-03	7.899E-03	1.047E-02	1.047E-02	1.005E-02	1.005E-02	1.005E-02	1.005E-02	6.500E-03
M 4724(150)	10.04	9.54	7.899E-03	7.899E-03	1.047E-02	1.047E-02	1.005E-02	1.005E-02	1.005E-02	1.005E-02	6.500E-03
T 402(150)	11.09	10.60	7.408E-03	7.408E-03	9.927E-03	9.927E-03	9.535E-03	9.535E-03	9.535E-03	9.535E-03	6.166E-03
M 4725(150)	11.09	10.60	7.408E-03	7.408E-03	9.927E-03	9.927E-03	9.535E-03	9.535E-03	9.535E-03	9.535E-03	6.166E-03
S 4482(150)	11.01	10.62	7.479E-03	7.479E-03	9.910E-03	9.910E-03	9.524E-03	9.524E-03	9.524E-03	9.524E-03	6.158E-03
T 404(150)	12.56	11.67	7.134E-03	7.134E-03	9.453E-03	9.453E-03	9.085E-03	9.085E-03	9.085E-03	9.085E-03	5.873E-03
M 4726(150)	12.56	11.67	7.134E-03	7.134E-03	9.453E-03	9.453E-03	9.085E-03	9.085E-03	9.085E-03	9.085E-03	5.873E-03
S 4483(150)	12.99	11.70	7.134E-03	7.134E-03	9.453E-03	9.453E-03	9.085E-03	9.085E-03	9.085E-03	9.085E-03	5.873E-03
T 405(150)	14.04	12.75	6.826E-03	6.826E-03	9.046E-03	9.046E-03	8.691E-03	8.691E-03	8.691E-03	8.691E-03	5.621E-03
M 4727(150)	14.04	12.75	6.826E-03	6.826E-03	9.046E-03	9.046E-03	8.691E-03	8.691E-03	8.691E-03	8.691E-03	5.621E-03
T 406(150)	14.07	12.77	6.826E-03	6.826E-03	9.046E-03	9.046E-03	8.691E-03	8.691E-03	8.691E-03	8.691E-03	5.621E-03
S 4484(150)	15.12	13.82	6.555E-03	6.555E-03	8.646E-03	8.646E-03	8.348E-03	8.348E-03	8.348E-03	8.348E-03	5.396E-03
T 407(150)	15.12	13.82	6.555E-03	6.555E-03	8.646E-03	8.646E-03	8.348E-03	8.348E-03	8.348E-03	8.348E-03	5.396E-03
M 4728(150)	15.12	13.82	6.555E-03	6.555E-03	8.646E-03	8.646E-03	8.348E-03	8.348E-03	8.348E-03	8.348E-03	5.396E-03
T 408(150)	16.17	14.88	6.319E-03	6.319E-03	8.348E-03	8.348E-03	8.047E-03	8.047E-03	8.047E-03	8.047E-03	5.201E-03
S 4485(150)	16.19	14.90	6.319E-03	6.319E-03	8.348E-03	8.348E-03	8.047E-03	8.047E-03	8.047E-03	8.047E-03	5.201E-03
T 409(150)	16.19	14.90	6.319E-03	6.319E-03	8.348E-03	8.348E-03	8.047E-03	8.047E-03	8.047E-03	8.047E-03	5.201E-03
M 4729(150)	17.24	15.95	6.122E-03	6.122E-03	8.047E-03	8.047E-03	7.771E-03	7.771E-03	7.771E-03	7.771E-03	5.022E-03
T 410(150)	17.24	15.95	6.122E-03	6.122E-03	8.047E-03	8.047E-03	7.771E-03	7.771E-03	7.771E-03	7.771E-03	5.022E-03
S 4486(150)	17.27	15.98	6.122E-03	6.122E-03	8.047E-03	8.047E-03	7.771E-03	7.771E-03	7.771E-03	7.771E-03	5.022E-03
T 411(150)	18.32	17.03	5.906E-03	5.906E-03	7.771E-03	7.771E-03	7.522E-03	7.522E-03	7.522E-03	7.522E-03	4.861E-03
M 4730(150)	18.32	17.03	5.906E-03	5.906E-03	7.771E-03	7.771E-03	7.522E-03	7.522E-03	7.522E-03	7.522E-03	4.861E-03
T 412(150)	18.35	17.05	5.906E-03	5.906E-03	7.771E-03	7.771E-03	7.522E-03	7.522E-03	7.522E-03	7.522E-03	4.861E-03
S 4487(150)	19.40	18.10	5.724E-03	5.724E-03	7.522E-03	7.522E-03	7.295E-03	7.295E-03	7.295E-03	7.295E-03	4.713E-03
T 413(150)	19.40	18.10	5.724E-03	5.724E-03	7.522E-03	7.522E-03	7.295E-03	7.295E-03	7.295E-03	7.295E-03	4.713E-03
M 4731(150)	19.40	18.10	5.724E-03	5.724E-03	7.522E-03	7.522E-03	7.295E-03	7.295E-03	7.295E-03	7.295E-03	4.713E-03
T 414(150)	19.40	18.10	5.724E-03	5.724E-03	7.522E-03	7.522E-03	7.295E-03	7.295E-03	7.295E-03	7.295E-03	4.713E-03
S 4488(150)	19.40	18.10	5.724E-03	5.724E-03	7.522E-03	7.522E-03	7.295E-03	7.295E-03	7.295E-03	7.295E-03	4.713E-03
T 415(150)	19.40	18.10	5.724E-03	5.724E-03	7.522E-03	7.522E-03	7.295E-03	7.295E-03	7.295E-03	7.295E-03	4.713E-03
M 4732(150)	19.40	18.10	5.724E-03	5.724E-03	7.522E-03	7.522E-03	7.295E-03	7.295E-03	7.295E-03	7.295E-03	4.713E-03

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 UNCLASSIFIED  
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7/10/73

MASA-01 ORBITER HEATING

AEDC(ARO, INC.) AMNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL R

VA240

GROUP	COMP	MODEL	MACH NO	PO(PISA)	TO(DEC R)	ALPHA-MODEL	ALPHA-SECTOR	ALPHA-PREBEND	ROLL-MODEL	YAW
95	3	ORBITER E	7.97	425.5	1307	30.00	.00	-30.00	-180.00	-0.00
T-1AF	P-1AF	O-1AF	V-1AF	RNO-1AF	MU-1AF	RE/FT	HREF	STREF		
(DEC R)	(PISA)	(FT/SEC)	(SLUGS/FT)	(LB-SEC/FT)	(FT-1)	(R-0175F)	(H-0175F)			
95.4	0.45	1.94E	3814	3.029E-05	7.677E-08	1.552E 04	3.444E-02	2.910E-02		
CAMERA	ROLL NO	PAINT (OFG F)	INITIAL TEMP (DEG F)	SQUARE ROOT (MMO/ACK)	TRARITO	BETA(10)				
TOP(1)	7915									
SIDE(S)	7606		350		0.550					
WOT(0.418)	0194									

PIC NO	TIME DELTME	H(10)	HREF	H(10)	HREF	H(10)	HREF	H(10)	HREF	ST(10)
T 011(150)	20.47	19.10	5.565E-03	1.607	7.375E-03	0.2130	7.087E-03	0.2047	4.581E-03	
S 4490(150)	20.47	19.10	5.565E-03	1.607	7.375E-03	0.2130	7.087E-03	0.2047	4.581E-03	
M 4733(150)	20.47	19.10	5.565E-03	1.607	7.375E-03	0.2130	7.087E-03	0.2047	4.581E-03	
T 012(150)	21.55	20.24	5.415E-03	1.563	7.176E-03	0.2072	6.896E-03	0.1991	4.456E-03	
S 4491(150)	21.55	20.24	5.415E-03	1.563	7.176E-03	0.2072	6.896E-03	0.1991	4.456E-03	
M 4734(150)	21.55	20.24	5.415E-03	1.563	7.176E-03	0.2072	6.896E-03	0.1991	4.456E-03	
T 013(150)	22.60	21.31	5.240E-03	1.524	6.977E-03	0.2020	6.724E-03	0.1941	4.343E-03	
S 4492(150)	22.60	21.31	5.240E-03	1.524	6.977E-03	0.2020	6.724E-03	0.1941	4.343E-03	
M 4735(150)	22.60	21.31	5.240E-03	1.524	6.977E-03	0.2020	6.724E-03	0.1941	4.343E-03	
T 014(150)	23.68	22.30	5.151E-03	1.487	6.826E-03	0.1971	6.560E-03	0.1894	4.239E-03	
S 4493(150)	23.68	22.30	5.151E-03	1.487	6.826E-03	0.1971	6.560E-03	0.1894	4.239E-03	
M 4736(150)	23.68	22.30	5.151E-03	1.487	6.826E-03	0.1971	6.560E-03	0.1894	4.239E-03	
T 015(150)	24.15	23.44	5.032E-03	1.453	6.648E-03	0.1925	6.408E-03	0.1850	4.139E-03	
S 4494(150)	24.15	23.44	5.032E-03	1.453	6.648E-03	0.1925	6.408E-03	0.1850	4.139E-03	
M 4737(150)	24.15	23.44	5.032E-03	1.453	6.648E-03	0.1925	6.408E-03	0.1850	4.139E-03	
T 016(150)	25.63	24.54	4.920E-03	1.420	6.520E-03	0.1882	6.266E-03	0.1809	4.047E-03	
S 4495(150)	25.63	24.54	4.920E-03	1.420	6.520E-03	0.1882	6.266E-03	0.1809	4.047E-03	
M 4738(150)	25.63	24.54	4.920E-03	1.420	6.520E-03	0.1882	6.266E-03	0.1809	4.047E-03	

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Group 9b  
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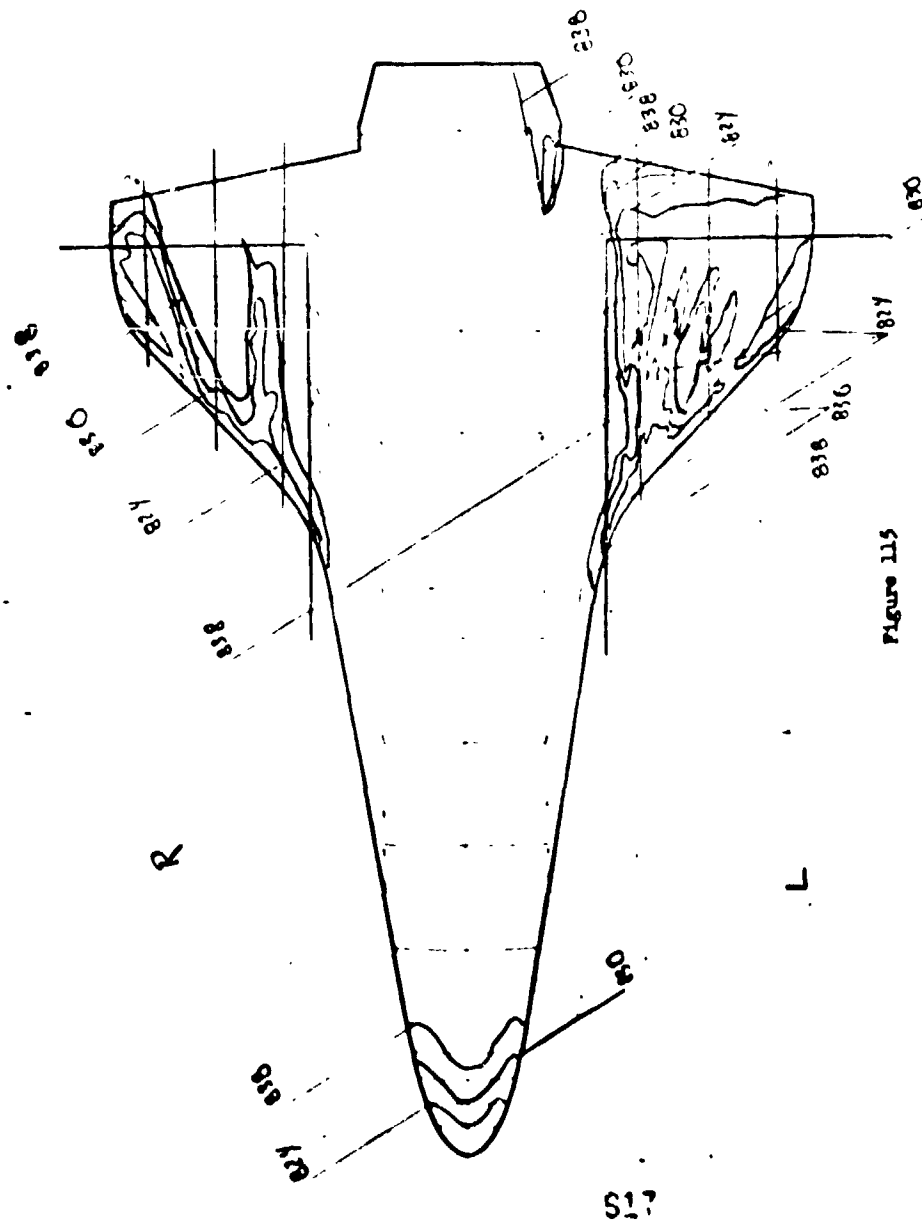


Figure 115





2/10/73

MEDICAM, INC.) ANNCLU AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 56 INCH HYPERSONIC TUNNEL A

341173-1 BALLOON 17-75VM

b6c7a

GROUP	CONFID	MODEL	MACH NO	POI(SIA)	TO(CEG P)	ALPHA-MODEL	ALPHA-SECTION	ALPHA-PREBEND	ROLL-MODEL	YAW
9A	7	QUATREM 64	7-97	424.4	1307	20.00	.00	-30.00	-180.00	-0.00

TYPE	Q=1NF	M=1NF	WU=1NF	WF/FT	MREF	STREF
1						
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(OF G R)	(OS I A)	(F T / S C)	(S L U G S / E I J)	(I B = S C / F I Z)	(F I - I)	I B =	O I 7 S F I	I B =	O I 7 S F I
06.4	.005	3814	3.019E-05	7.677E-08	1.947E 04	3.459E-02	2.913E-02		

CANFGA	ROLL NO	PAINT TEMP (DEG F)	INITIAL TEMP (DEG F)	SQUARE ROOT (RM0XCAK)	TBAR(TO)	BETA(TO)
1	1	100	100	10	10	10
2	2	100	100	10	10	10
3	3	100	100	10	10	10
4	4	100	100	10	10	10
5	5	100	100	10	10	10
6	6	100	100	10	10	10
7	7	100	100	10	10	10
8	8	100	100	10	10	10
9	9	100	100	10	10	10
10	10	100	100	10	10	10
11	11	100	100	10	10	10
12	12	100	100	10	10	10
13	13	100	100	10	10	10
14	14	100	100	10	10	10
15	15	100	100	10	10	10
16	16	100	100	10	10	10
17	17	100	100	10	10	10
18	18	100	100	10	10	10
19	19	100	100	10	10	10
20	20	100	100	10	10	10
21	21	100	100	10	10	10
22	22	100	100	10	10	10
23	23	100	100	10	10	10
24	24	100	100	10	10	10
25	25	100	100	10	10	10
26	26	100	100	10	10	10
27	27	100	100	10	10	10
28	28	100	100	10	10	10
29	29	100	100	10	10	10
30	30	100	100	10	10	10
31	31	100	100	10	10	10
32	32	100	100	10	10	10
33	33	100	100	10	10	10
34	34	100	100	10	10	10
35	35	100	100	10	10	10
36	36	100	100	10	10	10
37	37	100	100	10	10	10
38	38	100	100	10	10	10
39	39	100	100	10	10	10
40	40	100	100	10	10	10
41	41	100	100	10	10	10
42	42	100	100	10	10	10
43	43	100	100	10	10	10
44	44	100	100	10	10	10
45	45	100	100	10	10	10
46	46	100	100	10	10	10
47	47	100	100	10	10	10
48	48	100	100	10	10	10
49	49	100	100	10	10	10
50	50	100	100	10	10	10
51	51	100	100	10	10	10
52	52	100	100	10	10	10
53	53	100	100	10	10	10
54	54	100	100	10	10	10
55	55	100	100	10	10	10
56	56	100	100	10	10	10
57	57	100	100	10	10	10
58	58	100	100	10	10	10
59	59	100	100	10	10	10
60	60	100	100	10	10	10
61	61	100	100	10	10	10
62	62	100	100	10	10	

100(T)	7914			
510(FS)	7606	350	00	0.0550
				3.521E-01 4.3977E-01

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7/19/73

AEDICAM-INC.1 AMOLU AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL R

NASA-RI ORBITER HEATING

VA200

WINDUP CMMF16 MO-EL MACH NO PRIPSI1 TO(DEG R) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREBEND ROLL-MODEL YAW  
 04 7 GREITER BA 7.07 424.0 1307 30.00 .00 -30.00 -180.00 --.00

T-1NF 0-1NF 0-1NF V-1NF MU-1NF W-1NF H-1NF S-1NF SIREF  
 (DEG R) (PSIA) (FT/SEC) (SLUGS/FT3) (LBS-SEC/FT2) (LBS-1) (LBS-0.175FT) (LBS-0.175FT)  
 04.0 .045 1.002 3014 3.922E-05 7.074E-08 1.940E 04 3.441E-02 2.912E-02

CAMERA WOLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHOMXCK) TBAR(TO) BETA(TO)

TOP(T) 7016  
 SIREF(S) 7006  
 MOTICM(S) 0104

NO .0550 1.521E-01 0.3977E-01

PIC NO	TIME	RELTIME	M(TO)	M(TO)/MREF	M(TO)/MREF	MI	.912(TO)/MREF	MI	.912(TO)/MREF	ST(TO)
T 0341(150)	19.12	14.04	5.644E-03	.1445	7.546E-03	.2100	7.251E-03	.2095	7.251E-03	4.695E-03
S 4513(150)	19.12	14.04	5.644E-03	.1445	7.546E-03	.2100	7.251E-03	.2095	7.251E-03	4.695E-03
M 6754(150)	19.12	14.04	5.644E-03	.1445	7.546E-03	.2100	7.251E-03	.2095	7.251E-03	4.695E-03
T 0341(150)	20.12	14.04	5.535E-03	.1598	7.335E-03	.2118	7.044E-03	.2035	7.044E-03	4.559E-03
S 4513(150)	20.12	14.04	5.535E-03	.1598	7.335E-03	.2118	7.044E-03	.2035	7.044E-03	4.559E-03
M 6754(150)	20.12	14.04	5.535E-03	.1598	7.335E-03	.2118	7.044E-03	.2035	7.044E-03	4.559E-03
T 0341(150)	21.12	14.04	5.345E-03	.1556	7.137E-03	.2042	6.854E-03	.1982	6.854E-03	4.439E-03
S 4513(150)	21.12	14.04	5.345E-03	.1556	7.137E-03	.2042	6.854E-03	.1982	6.854E-03	4.439E-03
M 6754(150)	21.12	14.04	5.345E-03	.1556	7.137E-03	.2042	6.854E-03	.1982	6.854E-03	4.439E-03
T 0341(150)	22.12	14.04	5.102E-03	.1474	6.741E-03	.1953	6.494E-03	.1877	6.494E-03	4.326E-03
S 4513(150)	22.12	14.04	5.102E-03	.1474	6.741E-03	.1953	6.494E-03	.1877	6.494E-03	4.326E-03
M 6754(150)	22.12	14.04	5.102E-03	.1474	6.741E-03	.1953	6.494E-03	.1877	6.494E-03	4.326E-03
T 0341(150)	23.12	14.04	4.846E-03	.1412	6.479E-03	.1871	6.224E-03	.1798	6.224E-03	4.028E-03
S 4513(150)	23.12	14.04	4.846E-03	.1412	6.479E-03	.1871	6.224E-03	.1798	6.224E-03	4.028E-03
M 6754(150)	23.12	14.04	4.846E-03	.1412	6.479E-03	.1871	6.224E-03	.1798	6.224E-03	4.028E-03
T 0341(150)	24.12	14.04	4.644E-03	.1357	6.223E-03	.1798	5.900E-03	.1728	5.900E-03	3.870E-03
S 4513(150)	24.12	14.04	4.644E-03	.1357	6.223E-03	.1798	5.900E-03	.1728	5.900E-03	3.870E-03
M 6754(150)	24.12	14.04	4.644E-03	.1357	6.223E-03	.1798	5.900E-03	.1728	5.900E-03	3.870E-03



7/10/73

AEON (AEC, INC.) ARNOLD AFS, TENNESSEE  
VON KARMAN GAS DYNAMICS FACILITY  
50 INCH HYPERSONIC TUNNEL A

WA299

GROUP	CONFID	MODEL	MACH NO	PQ(PSTA)	TO(DG R)	ALPHA-MODEL	ALPHA-SECTION	ALPHA-PREBEND	ROLL-MODEL	YAW
97	2	ORBITER 5	7.97	424.4	1307	30.00	.00	-J3.00	-180.00	-0.00

T-INF	P-INF	Q-INF	V-INF	RMO-INF	MU-INF	RE/FT	MREF	SREF
(PSIA)	(PSIA)	(PSIA)	(FEI/SEC)	(LSUM/FEI)	(LR-SEC/FT <sup>2</sup> )	(FT-1)	(LR-0175F)	(IN-0125FT)
405.4	0.045	1.981	3814	3.918E-05	7.608E-08	1.94E-04	3.460E-02	2.914E-02

CAMERA	ROLL NO	PAINT TEMP (DEG F)	INITIAL TEMP (DEG F)	SQUARE ROOT (RHOXCKXK)	TSER(TOT)	BETA(TOT)
TOP(T)	7916					
SIDE(S)	7886	250	RD	.0535		0
BOTTOM(B)	8194					

PIC NO	TIME	DELTIME	H(T0)	H(T0)/HREF	H(.9T0)	H(.9T0)/HREF	H(.912T0)	H(.912T0)/HREF	ST(T0)
7	P41(P50)	1.15	MODEL HAS NOT REACHED CENTERLINE						
8	P42(P50)	1.15	MODEL HAS NOT REACHED CENTERLINE						
9	P43(P50)	1.18	MODEL HAS NOT REACHED CENTERLINE						
10	P44(P50)	2.23	MODEL HAS NOT REACHED CENTERLINE						
11	P45(P50)	2.23	MODEL HAS NOT REACHED CENTERLINE						
12	P46(P50)	2.25	MODEL HAS NOT REACHED CENTERLINE						

PROJECT NAME	DATE	DATA NOT YET VALID
7 943(250)	3-30	DATA NOT YET VALID
4 676(250)	3-30	DATA NOT YET VALID
4 622(250)	3-32	DATA NOT YET VALID

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7/10/73

NASA-RI ORBITER HEATING AEDC(ARO, INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 VA289 .50 INCH HYPERSONIC TUNNEL R

GROUP CONFIG MODEL MACH NO PO(P(SIA) TO(IDEG R) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREBEND ROLL-MODEL YAW  
 97 2 ORBITER 5 7.97 424.9 1307 30.00 .00 -30.00 -180.00 --0.00

T-INF P-INF O-INF V-INF RMO-INF MU-INF HE/FT HREF SREF  
 (DEG P) (PSIA) (PSIA) (FT/SEC) (SLUGS/FT<sup>3</sup>) (LB-SEC/FT<sup>2</sup>) (BTU/FT<sup>2</sup>) (BTU/FT<sup>2</sup>) (BTU/FT<sup>2</sup>) (BTU/FT<sup>2</sup>)  
 95.4 .045 1.983 3814 3.924E-05 7.677E-08 1.949E 06 3.461E-02 2.912E-02

CAPFRA HOLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RMOXCK) TRAR(TO) BETA(TO)  
 TOP(T) 7914  
 SIDF(S) 7686 80 .0535 2.216E-01 2.3927E-01  
 BOTTOM(B) 8194

PIC NO	TIME	DELTIME	H(TO)	H(TO)/HREF	H(.9TO)	H(.9TO)/HREF	H(.912TO)	H(.912TO)/HREF	ST(TO)
T 850(250)	10.79	9.51	4.151E-03	.1199	5.248E-03	.1515	5.081E-03	.1467	3.436E-03
S 4528(250)	10.79	9.51	4.151E-03	.1199	5.248E-03	.1515	5.081E-03	.1467	3.436E-03
M 6772(250)	10.79	9.51	4.151E-03	.1199	5.248E-03	.1515	5.081E-03	.1467	3.436E-03
T 851(250)	11.84	10.54	3.939E-03	.1137	4.980E-03	.1438	4.822E-03	.1392	3.260E-03
M 4773(250)	11.84	10.54	3.939E-03	.1137	4.980E-03	.1438	4.822E-03	.1392	3.260E-03
S 4530(250)	11.86	10.58	3.935E-03	.1136	4.974E-03	.1436	4.816E-03	.1391	3.257E-03
T 852(250)	12.51	11.64	3.753E-03	.1083	4.744E-03	.1370	4.593E-03	.1326	3.106E-03
S 4531(250)	12.51	11.64	3.753E-03	.1083	4.744E-03	.1370	4.593E-03	.1326	3.106E-03
M 6774(250)	12.51	11.64	3.753E-03	.1083	4.744E-03	.1370	4.593E-03	.1326	3.106E-03
T 875(250)	13.57	12.69	3.544E-03	.1037	4.530E-03	.1311	4.399E-03	.1270	2.973E-03
M 4532(250)	13.59	12.71	3.540E-03	.1037	4.530E-03	.1310	4.395E-03	.1269	2.971E-03
S 4532(250)	13.59	12.71	3.540E-03	.1037	4.530E-03	.1310	4.395E-03	.1269	2.971E-03
T 854(250)	15.04	13.74	3.450E-03	.0996	4.362E-03	.1259	4.224E-03	.1219	2.855E-03
S 4533(250)	15.04	13.74	3.450E-03	.0996	4.362E-03	.1259	4.224E-03	.1219	2.855E-03
M 6776(250)	15.04	13.74	3.450E-03	.0996	4.362E-03	.1259	4.224E-03	.1219	2.855E-03
T 855(250)	16.09	14.84	3.325E-03	.0960	4.205E-03	.1214	4.071E-03	.1175	2.752E-03
M 4534(250)	16.12	14.84	3.323E-03	.0959	4.201E-03	.1213	4.068E-03	.1174	2.749E-03
S 4534(250)	16.12	14.84	3.323E-03	.0959	4.201E-03	.1213	4.068E-03	.1174	2.749E-03
T 856(250)	17.17	15.83	3.211E-03	.0927	4.060E-03	.1172	3.931E-03	.1134	2.656E-03
M 4535(250)	17.19	15.82	3.209E-03	.0926	4.057E-03	.1171	3.928E-03	.1134	2.654E-03
S 4535(250)	17.19	15.82	3.209E-03	.0926	4.057E-03	.1171	3.928E-03	.1134	2.654E-03
T 857(250)	18.25	16.97	3.108E-03	.0897	3.929E-03	.1134	3.804E-03	.1098	2.570E-03
M 4536(250)	18.25	16.97	3.108E-03	.0897	3.929E-03	.1134	3.804E-03	.1098	2.570E-03
S 4536(250)	18.25	16.97	3.108E-03	.0897	3.929E-03	.1134	3.804E-03	.1098	2.570E-03
T 858(250)	19.30	18.02	3.016E-03	.0870	3.813E-03	.1100	3.691E-03	.1065	2.494E-03

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7/14/73

NASA-R1 ORBITER HEATING

AEDC(ARO, INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSON TUNNEL R

VA289

GROUP COMFIG MODEL MACH NO PO(P/SIA) TO(DEG R) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREBEND ROLL-MODEL YAW  
 97 2 GREITER S 7.97 425.7 1307 30.00 .00 -30.00 -180.00 -.00

T-INF P-INF Q-INF V-INF MU-INF MU-INF RE/FT HREF STREF  
 (DEG R) (P/SIA) (P/SIA) (P/SIA) (SLUGS/FT) (SLUGS/FT) (FT-1) (R-0175E1) (R-0175E1)  
 95.4 .045 1.9P7 3814 3.930E-05 7.680E-08 1.952E 06 3.465E-02 2.910E-02

CAMFRA ROLL NO PAINT ICMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHOXCKK) TRAR(TO) BETAI(TO)

TOP(T) 7916  
 SLOF(S) 7686 250 .0535 2.210E-01 2.3927E-01  
 HOTIC(MB) 8194

PTC NO	TIME DELTIME	H(TO)	H(TO)/HREF	H(.970)	H(.970)/HREF	H(.912TO)	H(.912TO)/HREF	ST(TO)
S 4537(250)	19.32	3.014E-03	.0870	3.010E-03	.1100	3.689E-03	.1065	2.493E-03
M 4780(250)	19.32	3.014E-03	.0870	3.010E-03	.1100	3.689E-03	.1065	2.493E-03
S 4538(250)	20.37	2.929E-03	.0845	3.704E-03	.1069	3.586E-03	.1035	2.422E-03
M 4781(250)	20.37	2.929E-03	.0845	3.704E-03	.1069	3.586E-03	.1035	2.422E-03
S 4539(250)	20.40	2.927E-03	.0845	3.701E-03	.1068	3.583E-03	.1034	2.420E-03
M 4782(250)	20.40	2.927E-03	.0845	3.701E-03	.1068	3.583E-03	.1034	2.420E-03
S 4540(250)	21.45	2.850E-03	.0823	3.603E-03	.1040	3.489E-03	.1007	2.358E-03
M 4783(250)	21.45	2.850E-03	.0823	3.603E-03	.1040	3.489E-03	.1007	2.358E-03
S 4541(250)	21.45	2.850E-03	.0823	3.603E-03	.1040	3.489E-03	.1007	2.358E-03
M 4784(250)	21.45	2.850E-03	.0823	3.603E-03	.1040	3.489E-03	.1007	2.358E-03
S 4542(250)	22.50	2.777E-03	.0802	3.513E-03	.1014	3.401E-03	.0981	2.296E-03
M 4785(250)	22.50	2.777E-03	.0802	3.513E-03	.1014	3.401E-03	.0981	2.296E-03
S 4543(250)	22.53	2.777E-03	.0801	3.511E-03	.1013	3.399E-03	.0981	2.296E-03
M 4786(250)	22.53	2.777E-03	.0801	3.511E-03	.1013	3.399E-03	.0981	2.296E-03
S 4544(250)	23.78	2.649E-03	.0779	3.412E-03	.0984	3.303E-03	.0953	2.231E-03
M 4787(250)	23.78	2.649E-03	.0779	3.412E-03	.0984	3.303E-03	.0953	2.231E-03
S 4545(250)	23.78	2.649E-03	.0779	3.412E-03	.0984	3.303E-03	.0953	2.231E-03
M 4788(250)	23.78	2.649E-03	.0779	3.412E-03	.0984	3.303E-03	.0953	2.231E-03
S 4546(250)	24.53	2.545E-03	.0746	3.268E-03	.0943	3.164E-03	.0913	2.136E-03
M 4789(250)	24.53	2.545E-03	.0746	3.268E-03	.0943	3.164E-03	.0913	2.136E-03
S 4547(250)	24.53	2.545E-03	.0746	3.268E-03	.0943	3.164E-03	.0913	2.136E-03
M 4790(250)	24.53	2.545E-03	.0746	3.268E-03	.0943	3.164E-03	.0913	2.136E-03
S 4548(250)	26.55	2.444E-03	.0717	3.141E-03	.0906	3.041E-03	.0877	2.052E-03
M 4791(250)	26.55	2.444E-03	.0717	3.141E-03	.0906	3.041E-03	.0877	2.052E-03
S 4549(250)	26.55	2.444E-03	.0717	3.141E-03	.0906	3.041E-03	.0877	2.052E-03
M 4792(250)	26.55	2.444E-03	.0717	3.141E-03	.0906	3.041E-03	.0877	2.052E-03

624

Group 98  
79/16  
100

8595  
 $\alpha = 30^\circ$   
 $\phi = 0^\circ$

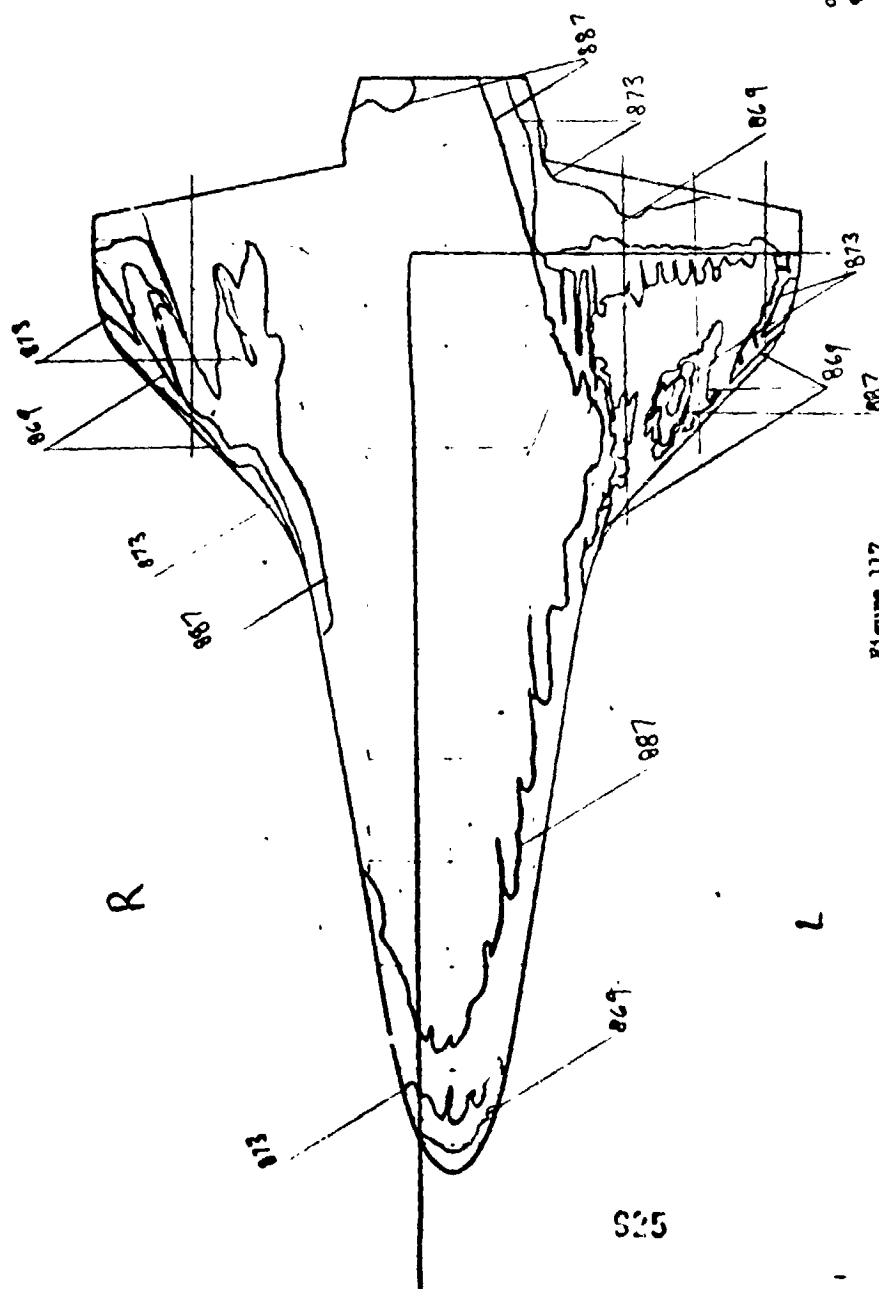


Figure 117

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7/10/73

NASA-RI ORBITER HEATING

AEDC(ARO,INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL R

VA2R9

GROUP CONFID MODEL MACH NO PO(PSIA) TO(DEG R) ALPHA-MODEL ALPHA-PREBEND ROLL-MODEL YAW  
 9R 7.97 424.5 1307 30.00 .00 -30.00 -180.00 -.00

T-INF P-INF O-INF V-INF RHO-INF MU-INF HE/FT HREF STREF  
 (DEG R) (PSIA) (ET/SEC) (SLUGS/ET/3) (LB-SEC/ET/2) (ET-1) (LB-0175FI) (H2-0175FI)  
 95.4 .045 1.981 3814 3.019E-05 7.078E-08 1.547E 06 3.440E-02 2.913E-02

CAMERA HOLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHOXCAK) TRAR(TO) BETA(TO)  
 TOP(T) 7516  
 SIDE(S) 7686  
 MOTION(B) 8194  
 0 0 0

PIC NO TIME DELTME H(TO) M(TO)/HREF H(9TO) H(912TO) H(912TO)/HREF ST(TO)

T 265(100) 1.15 MODEL HAS NOT REACHED CENTERLINE  
 M 6787(100) 1.15 MODEL HAS NOT REACHED CENTERLINE  
 S 4544(100) 1.15 MODEL HAS NOT REACHED CENTERLINE  
 T 266(100) 2.23 MODEL HAS NOT REACHED CENTERLINE  
 M 6788(100) 2.23 MODEL HAS NOT REACHED CENTERLINE  
 S 4545(100) 2.23 MODEL HAS NOT REACHED CENTERLINE

INJECT TIME = 2.28

T 267(100) 3.30 DATA NOT YET VALID  
 S 4546(100) 3.30 DATA NOT YET VALID  
 M 6789(100) 3.30 DATA NOT YET VALID

M 6790(100) 4.36 1.030E-02 .2974 1.330E-02 .3840 1.283E-02 .3706 8.505E-03  
 T 268(100) 4.36 1.026E-02 .2962 1.324E-02 .3825 1.278E-02 .3691 8.470E-03  
 S 4547(100) 4.36 1.026E-02 .2962 1.324E-02 .3825 1.278E-02 .3691 8.470E-03  
 T 269(100) 4.15 1.026E-02 .2960 1.324E-02 .3825 1.278E-02 .3691 8.470E-03  
 M 6791(100) 4.15 1.026E-02 .2960 1.324E-02 .3825 1.278E-02 .3691 8.470E-03  
 S 4548(100) 4.15 1.026E-02 .2960 1.324E-02 .3825 1.278E-02 .3691 8.470E-03  
 T 270(100) 5.23 1.020E-02 .2981 1.320E-02 .3840 1.283E-02 .3706 8.505E-03  
 M 6792(100) 5.23 1.020E-02 .2981 1.320E-02 .3840 1.283E-02 .3706 8.505E-03  
 S 4549(100) 5.23 1.020E-02 .2981 1.320E-02 .3840 1.283E-02 .3706 8.505E-03  
 T 271(100) 6.28 1.020E-02 .2982 1.320E-02 .3840 1.283E-02 .3706 8.505E-03  
 M 6793(100) 6.28 1.020E-02 .2982 1.320E-02 .3840 1.283E-02 .3706 8.505E-03  
 S 4550(100) 6.28 1.020E-02 .2982 1.320E-02 .3840 1.283E-02 .3706 8.505E-03  
 T 272(100) 7.36 1.020E-02 .2982 1.320E-02 .3840 1.283E-02 .3706 8.505E-03  
 M 6794(100) 7.36 1.020E-02 .2982 1.320E-02 .3840 1.283E-02 .3706 8.505E-03  
 S 4551(100) 7.36 1.020E-02 .2982 1.320E-02 .3840 1.283E-02 .3706 8.505E-03  
 T 273(100) 8.41 1.020E-02 .2982 1.320E-02 .3840 1.283E-02 .3706 8.505E-03  
 M 6795(100) 8.41 1.020E-02 .2982 1.320E-02 .3840 1.283E-02 .3706 8.505E-03  
 S 4552(100) 8.41 1.020E-02 .2982 1.320E-02 .3840 1.283E-02 .3706 8.505E-03

529

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7/10/73

AEDC(ARO, INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL R

NASA-RI ORBITER HEATING

VA2R9

GROUP	CONFID	MODEL	MACH NO	POI(PSIA)	TO(DEG R)	ALPHA-MODEL	ALPHA-SECTOR	ALPHA-PREBEND	ROLL-MODEL	YAW
9A	6	ORBITER R3	7.77	425.4	1307	30.00	.00	-30.00	-180.00	-0.00

T-INF	P-INF	Q-INF	V-INF	RHO-INF	MU-INF	RE/FT	HREF	SIREF
(DEG R)	(PSIA)	(FT/SEC)	(FT/SEC)	(SLUGS/FT <sup>3</sup> )	(LB-SEC/FT <sup>2</sup> )	(FT-L)	(R <sub>0</sub> -.0175E1)	(M <sub>0</sub> -.0175E1)
95.4	.045	1.945	3814	3.028E-05	7.678E-08	1.951E 06	3.444E-02	2.910E-02

CAMERA	HOLL NO	PAINT IFMP	(DEG F)	INITIAL TEMP	(DEG F)	SQUARE ROOT	(RHUACAK)	TBRAR(TO)	BETA(TO)
TOP(IT)	7916								
SIDE(S)	7686	300						2.869E-01	3.3202E-01
HOTICM19)	8194								

PIC NO	TIME DELTIME	H(TO)	HREF	H(.910)	H(.910)/HREF	H(.912TO)	H(.912TO)/HREF	ST(TO)
T 8731(300)	9.71	8.43	.1796	8.430E-03	.2319	7.750E-03	.2238	5.135E-03
S 4552(300)	9.71	8.43	.1796	8.430E-03	.2319	7.750E-03	.2238	5.135E-03
T 8741(300)	10.76	9.48	.1694	7.572E-03	.2187	7.308E-03	.2111	4.844E-03
S 4553(300)	10.76	9.48	.1694	7.572E-03	.2187	7.308E-03	.2111	4.844E-03
M 4796(300)	10.76	9.48	.1694	7.572E-03	.2187	7.308E-03	.2111	4.844E-03
T 8751(300)	11.84	10.56	.1605	7.176E-03	.2073	6.925E-03	.2000	4.590E-03
S 4554(300)	11.84	10.56	.1605	7.176E-03	.2073	6.925E-03	.2000	4.590E-03
M 4797(300)	11.84	10.56	.1605	7.176E-03	.2073	6.925E-03	.2000	4.590E-03
T 8761(300)	12.89	11.61	.1530	6.844E-03	.1976	6.604E-03	.1907	4.373E-03
S 4555(300)	12.89	11.61	.1530	6.844E-03	.1976	6.604E-03	.1907	4.373E-03
M 4798(300)	12.89	11.61	.1530	6.844E-03	.1976	6.604E-03	.1907	4.373E-03
T 8771(300)	13.57	12.69	.1464	6.547E-03	.1890	6.318E-03	.1824	4.185E-03
S 4556(300)	13.57	12.69	.1464	6.547E-03	.1890	6.318E-03	.1824	4.185E-03
M 4799(300)	13.57	12.69	.1464	6.547E-03	.1890	6.318E-03	.1824	4.185E-03
T 8781(300)	15.02	13.74	.1407	6.291E-03	.1815	6.071E-03	.1753	4.021E-03
S 4557(300)	15.02	13.74	.1407	6.291E-03	.1815	6.071E-03	.1753	4.021E-03
M 4800(300)	15.02	13.74	.1407	6.291E-03	.1815	6.071E-03	.1753	4.021E-03
T 8791(300)	15.09	14.81	.1355	6.059E-03	.1749	5.847E-03	.1688	3.872E-03
S 4558(300)	15.09	14.81	.1355	6.059E-03	.1749	5.847E-03	.1688	3.872E-03
M 4801(300)	15.09	14.81	.1355	6.059E-03	.1749	5.847E-03	.1688	3.872E-03
T 8801(300)	16.12	14.84	.1354	6.059E-03	.1748	5.842E-03	.1686	3.869E-03
S 4559(300)	16.12	14.84	.1354	6.059E-03	.1748	5.842E-03	.1686	3.869E-03
M 4802(300)	16.12	14.84	.1354	6.059E-03	.1748	5.842E-03	.1686	3.869E-03
T 8811(300)	17.17	15.89	.1308	5.850E-03	.1689	5.645E-03	.1630	3.738E-03
S 4560(300)	17.17	15.89	.1308	5.850E-03	.1689	5.645E-03	.1630	3.738E-03
M 4803(300)	17.17	15.89	.1308	5.850E-03	.1689	5.645E-03	.1630	3.738E-03
T 8821(300)	18.22	16.94	.1266	5.661E-03	.1634	5.463E-03	.1577	3.617E-03
S 4561(300)	18.22	16.94	.1266	5.661E-03	.1634	5.463E-03	.1577	3.617E-03
M 4804(300)	18.22	16.94	.1266	5.661E-03	.1634	5.463E-03	.1577	3.617E-03

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7/10/73

NASA-RI ORBITER HEATING

VA299

AEDCIARD, INC.) ANNOLU AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL R

GROUP CONF16 MODEL MACH NO PO(P(SIA) TO(DEC R) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREBEND ROLL-MODEL YAW  
 94 6 ORBITER R3 7.97 425.6 1307 30.00 .00 -30.00 -100.00 -0.00

T-INF P-INF O-INF V-INF MU-INF RMU-INF MU-INF RE/FT MREF STREF  
 (DEG R) (PSIA) (PSIA) (FT/SFC) (SLUGS/FT3) (LH-SEC/FT2) (FT-1) (R- .0175FI) (R- .0175FI)  
 95.4 .045 1.596 1614 3.930E-05 7.677E-08 1.952E 06 3.444E-02 2.908E-02

CAMERA ROLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHORCK) TBAR(TO) BETA(TO)

TOP(IT) 7516 80 .0544 2.869E-01 3.3202E-01  
 SIDE(S) 7686  
 MOTICM(R) 8194

PTC NO	TIME	RELTIME	H(TO)	HREF	H(.9TO)	H(.9TO)/HREF	H(.912TO)	H(.912TO)/HREF	ST(TO)
T	PR2(100)	19.30	14.02	4.255E-03	5.494E-03	.1228	5.302E-03	.1530	3.509E-03
S	461(100)	19.30	14.02	4.255E-03	5.494E-03	.1228	5.302E-03	.1530	3.509E-03
M	AP04(100)	19.30	14.02	4.255E-03	5.494E-03	.1228	5.302E-03	.1530	3.509E-03
T	PR3(100)	20.37	19.05	4.133E-03	5.337E-03	.1193	5.150E-03	.1487	3.410E-03
S	462(100)	20.37	19.09	4.133E-03	5.337E-03	.1193	5.150E-03	.1487	3.410E-03
M	AP05(100)	20.37	19.09	4.133E-03	5.337E-03	.1193	5.150E-03	.1487	3.410E-03
T	PR4(100)	21.42	20.1E	4.024E-03	5.195E-03	.1161	5.014E-03	.1447	3.318E-03
S	463(100)	21.42	20.1E	4.024E-03	5.195E-03	.1161	5.014E-03	.1447	3.318E-03
M	AP06(100)	21.42	20.1E	4.024E-03	5.195E-03	.1161	5.014E-03	.1447	3.318E-03
T	PR5(100)	22.50	21.22	3.921E-03	5.062E-03	.1131	4.885E-03	.1410	3.232E-03
S	464(100)	22.50	21.22	3.921E-03	5.062E-03	.1131	4.885E-03	.1410	3.232E-03
M	AP07(100)	22.50	21.22	3.921E-03	5.062E-03	.1131	4.885E-03	.1410	3.232E-03
T	PR6(100)	24.18	22.90	3.774E-03	4.873E-03	.1090	4.703E-03	.1357	3.113E-03
M	AP08(100)	24.18	22.90	3.774E-03	4.873E-03	.1090	4.703E-03	.1357	3.113E-03
S	465(100)	24.20	22.92	3.772E-03	4.870E-03	.1089	4.700E-03	.1356	3.110E-03
T	PR7(100)	26.23	24.95	3.614E-03	4.671E-03	.1044	4.507E-03	.1300	2.982E-03
S	466(100)	26.23	24.95	3.614E-03	4.671E-03	.1043	4.505E-03	.1300	2.981E-03
M	AP09(100)	26.23	24.95	3.614E-03	4.671E-03	.1043	4.505E-03	.1300	2.981E-03
T	PR8(100)	27.06	26.98	3.477E-03	4.490E-03	.1003	4.333E-03	.1250	2.866E-03
S	467(100)	27.06	26.98	3.477E-03	4.490E-03	.1003	4.333E-03	.1250	2.866E-03
M	AP10(100)	27.06	26.98	3.477E-03	4.490E-03	.1003	4.333E-03	.1250	2.866E-03
T	PR9(100)	30.28	29.01	3.354E-03	4.330E-03	.0968	4.178E-03	.1205	2.763E-03
S	468(100)	30.28	29.01	3.354E-03	4.330E-03	.0968	4.178E-03	.1205	2.763E-03
M	AP11(100)	30.28	29.01	3.354E-03	4.330E-03	.0968	4.178E-03	.1205	2.763E-03

396

328

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7916.  
Camp 99

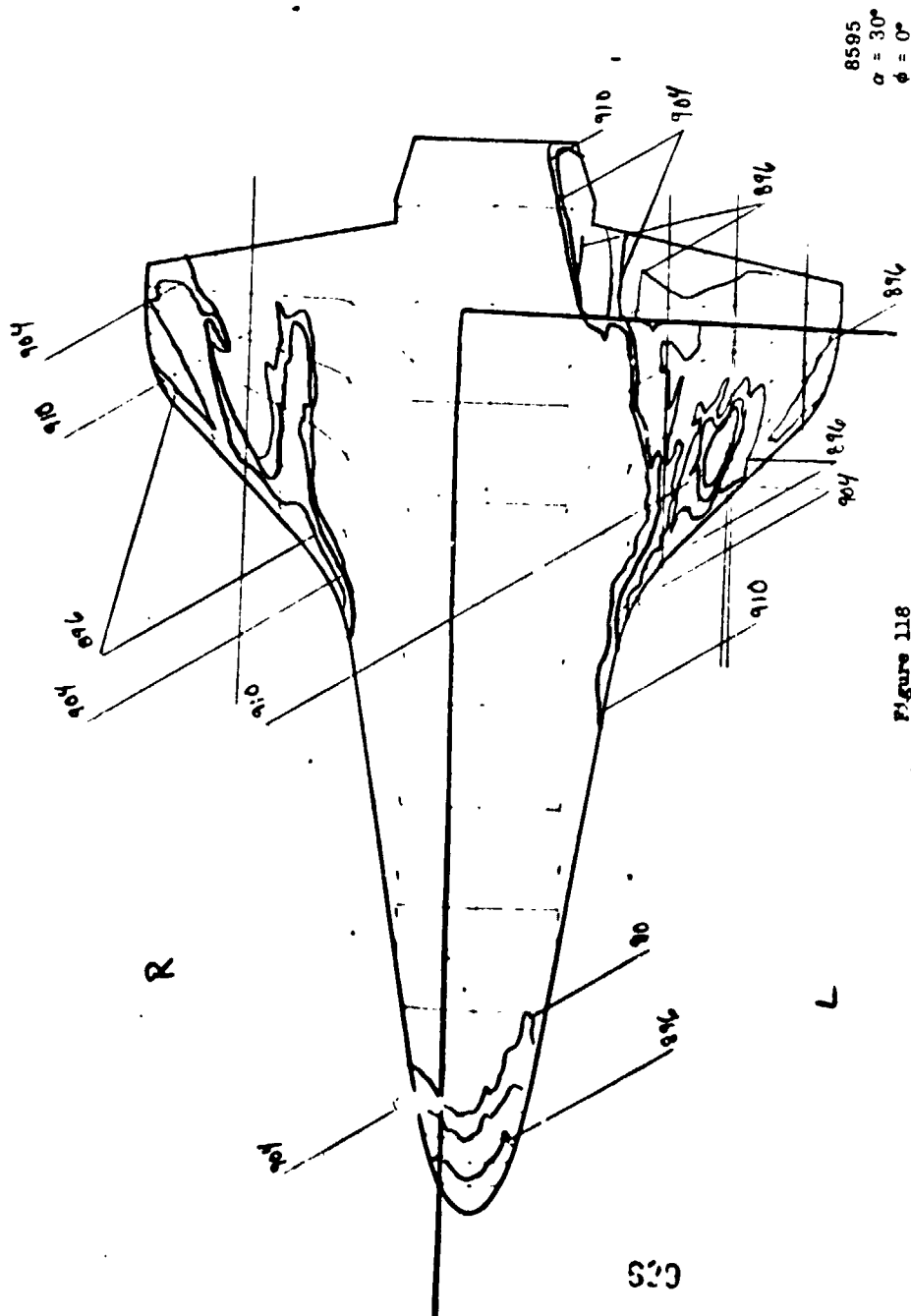


Figure 118

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7/10/73

NASA-RI ORBITER -EATING  
AEDC(ARO-INC-1) ARNOLD AFS, TENNESSEE  
VON KARMAN GAS DYNAMICS FACILITY  
50 INCH HYPERSONIC TUNNEL A

VA249

GROUP CONFIG MODEL MACH NO PO(P5IA) TO(DEG R) ALPHA-MODEL ALPHA-SECTION ALPHA-PREBEND ROLL-MODEL YAW  
90 5 ORBITER R2 7.97 424.0 1307 30.00 .00 -30.00 -180.00 -0.00  
T-1AF P-INF Q-INF V-INF RMO-INF MU-INF RE/FT HREF STREF  
(DEG R) (P5IA) (FT/SEC) (SLUGS/FT) (LB-SEC/FT) (FT-1) (R-0175EI) (R-0175EI)  
95.3 .045 1.979 3813 3.916E-05 7.676E-08 1.945E 06 3.445E-02 2.914E-02  
CAMFRA MOLL NO PAINT IFMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHO/CXK) TRAR(TO) BETA(TO)  
TOP(IT) 7916  
SIDE(S) 7426  
MOT(MIR) 8194

PIC NO TIME DELTIME H(TO) HREF H(-910) H(-910)/HREF H(-912TO) H(-912TO)/HREF ST(TO)  
M 612(100) 1.15 MODEL HAS NOT REACHED CENTERLINE  
T 610(100) 1.18 MODEL HAS NOT REACHED CENTERLINE  
S 4564(100) 1.18 MODEL HAS NOT REACHED CENTERLINE  
M 613(100) 2.23 MODEL HAS NOT REACHED CENTERLINE  
T 611(100) 2.25 MODEL HAS NOT REACHED CENTERLINE  
S 4570(100) 2.25 MODEL HAS NOT REACHED CENTERLINE  
INJECT TIME 2.28  
S 4571(100) 3.20 DATA NOT YET VALID  
M 614(100) 3.20 DATA NOT YET VALID

397

T	615(100)	4.38	3.10	1.026F-02	.2966	1.325E-02	.3430	1.279E-02	.3696	0.485E-03
S	4572(100)	4.38	3.10	1.026F-02	.2966	1.325E-02	.3430	1.279E-02	.3696	0.485E-03
M	615(100)	4.38	3.10	1.026F-02	.2966	1.325E-02	.3430	1.279E-02	.3696	0.485E-03
T	616(100)	5.43	4.15	1.026F-03	.2564	1.145E-02	.3110	1.105E-02	.3194	7.335E-03
M	616(100)	5.43	4.15	1.026F-03	.2564	1.145E-02	.3110	1.105E-02	.3194	7.335E-03
S	4573(100)	5.46	4.18	1.026F-03	.2564	1.145E-02	.3110	1.105E-02	.3194	7.335E-03
T	617(100)	6.51	5.23	7.903F-03	.2284	1.020E-02	.2949	9.847E-03	.2846	6.533E-03
S	4574(100)	6.51	5.23	7.903F-03	.2284	1.020E-02	.2949	9.847E-03	.2846	6.533E-03
M	617(100)	6.51	5.23	7.903F-03	.2284	1.020E-02	.2949	9.847E-03	.2846	6.533E-03
T	618(100)	7.56	6.28	7.211F-03	.2084	9.31E-03	.2690	8.961E-03	.2592	5.949E-03
M	618(100)	7.56	6.28	7.211F-03	.2084	9.31E-03	.2690	8.961E-03	.2592	5.949E-03
S	4575(100)	7.58	6.31	7.177F-03	.2080	9.292E-03	.2686	8.967E-03	.2592	5.949E-03
T	619(100)	8.63	7.34	6.663F-03	.1926	8.602E-03	.2487	8.302E-03	.2400	5.509E-03
M	619(100)	8.63	7.34	6.663F-03	.1926	8.602E-03	.2487	8.302E-03	.2400	5.509E-03
S	4576(100)	8.66	7.38	6.652F-03	.1922	8.588E-03	.2482	8.288E-03	.2395	5.499E-03
T	620(100)	9.71	8.43	6.223F-03	.1798	8.035E-03	.2322	7.754E-03	.2241	5.143E-03
M	620(100)	9.71	8.43	6.223F-03	.1798	8.035E-03	.2322	7.754E-03	.2241	5.143E-03
S	4577(100)	9.71	8.43	6.223F-03	.1798	8.035E-03	.2322	7.754E-03	.2241	5.143E-03

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NASA-RI ORBITER HEATING

AEDC(AMU-INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL R

GROUP CONFIG MODEL MACH NO PO(PSIA) TO(DEC R) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREBEND ROLL-MODEL YAW  
 99 99 CRITTER R2 7.97 424.7 1306 30.00 .00 -30.00 -180.00 -.00

T-INF P-INF O-INF V-INF RMG-INF MU-INF RF/FT HREF STREF  
 (DEG R) (PSIA) (PSIA) (FT/SEC) (SLUGS/FT3) (LB-SEC/FT2) (FT-1) (R=.0175FT) (R=.0175FT)

95.3 .045 1.982 3813 3.923E-05 7.675E-08 1.949E 06 3.440E-02 2.912E-02

CAMERA ROLL NO PAINT IFMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RMORCAK) TRANSITIO RETAITO  
 TOP(T) 7914  
 SIDE(S) 7686  
 HOTTC(H) 8194 300 80 .0544 2.870E-01 3.3219E-01

PIC NO	TIME DELT	H(TO)	HREF	H(OTO)/HREF	H(OTO)/HREF	M(OTO)/HREF	M(OTO)/HREF	ST(ITO)
M 421(100)	10.76	9.48	5.868E-03	.1696	7.576E-03	.2189	7.312E-03	.2113
T 421(100)	10.76	9.51	5.868E-03	.1694	7.564E-03	.2187	7.302E-03	.2110
S 421(100)	10.79	9.51	5.868E-03	.1694	7.566E-03	.2187	7.302E-03	.2110
T 421(100)	11.04	10.54	5.501E-03	.1607	7.180E-03	.2075	6.929E-03	.2002
S 421(100)	11.04	10.54	5.501E-03	.1607	7.180E-03	.2075	6.929E-03	.2002
M 421(100)	11.04	10.54	5.501E-03	.1607	7.180E-03	.2075	6.929E-03	.2002
T 421(100)	11.04	11.64	5.244E-03	.1531	6.840E-03	.1977	6.601E-03	.1908
S 421(100)	11.04	11.64	5.244E-03	.1531	6.840E-03	.1977	6.601E-03	.1908
M 421(100)	11.04	11.64	5.244E-03	.1531	6.840E-03	.1977	6.601E-03	.1908
T 421(100)	13.57	12.69	5.073E-03	.1466	6.550E-03	.1893	6.321E-03	.1826
S 421(100)	13.57	12.69	5.073E-03	.1466	6.550E-03	.1893	6.321E-03	.1826
M 421(100)	13.59	12.71	5.068E-03	.1464	6.544E-03	.1891	6.315E-03	.1825
T 421(100)	15.04	13.74	4.871E-03	.1407	6.289E-03	.1817	6.069E-03	.1753
S 421(100)	15.04	13.74	4.871E-03	.1407	6.289E-03	.1817	6.069E-03	.1753
M 421(100)	15.04	13.74	4.871E-03	.1407	6.289E-03	.1817	6.069E-03	.1753
T 421(100)	15.04	14.81	4.655E-03	.1356	6.062E-03	.1751	5.850E-03	.1690
S 421(100)	15.04	14.84	4.655E-03	.1355	6.057E-03	.1750	5.845E-03	.1689
M 421(100)	15.04	14.84	4.655E-03	.1355	6.057E-03	.1750	5.845E-03	.1689
T 421(100)	17.17	15.89	4.533E-03	.1310	5.853E-03	.1691	5.644E-03	.1632
S 421(100)	17.17	15.89	4.533E-03	.1310	5.853E-03	.1691	5.644E-03	.1632
M 421(100)	17.17	15.89	4.533E-03	.1310	5.853E-03	.1691	5.644E-03	.1632
T 421(100)	17.17	16.97	4.347E-03	.1267	5.644E-03	.1636	5.466E-03	.1579
S 421(100)	17.17	16.97	4.347E-03	.1267	5.644E-03	.1636	5.466E-03	.1579
M 421(100)	17.17	16.97	4.347E-03	.1267	5.644E-03	.1636	5.466E-03	.1579
T 421(100)	19.50	18.02	4.247E-03	.1230	5.497E-03	.1517	5.304E-03	.1532

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7/10/73

NASA-R1 AIRCRAFT PEATING

AEDC(ARO-1AC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL W

VA249

GROUP CAME16 MODEL MICH NO PN(PISA) T(DEG R) ALPHA-MODEL ALPHA-SECTION ALPHA-PREBEND ROLL-MODEL YAW  
 99 4 GREITER R2 7.97 425.2 1306 30.06 .00 -30.00 -180.00 -.00

T-INF B-INF Q-INF V-INF MU-INF RE/FT MREF STREF  
 (DEG R) (PSIA) (PSIA) (FT/SEC) (SLUGS/FT3) (LB-SEC/FT2) (FI-1) (RM-0175E1) (R=-0175E1)  
 99.7 .045 1.004 3R11 3.928E-05 7.675F-08 1.531E 06 3.462E-02 2.910E-02

CAMERA HOLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHOXAK) TBRN(TO) BETA(TO)

TOP(1) 7516  
 SIRETS 7696 300  
 BOTTOM(R) 8194 .0544 2.870E-01 3.3219E-01

PIC NO TIME RELTIME H(TO) M(TO) H(-910)/MREF H(-910) M(-912TO)/MREF H(-912TO) SY(TO)  
 T 507(100) 19.32 18.04 4.254E-03 .1229 5.493E-03 .1587 5.301E-03 .1531 3.513E-03  
 S 4544(100) 19.32 14.04 4.254E-03 .1229 5.493E-03 .1587 5.301E-03 .1531 3.513E-03  
 T 900(100) 20.17 19.05 4.136E-03 .1195 5.330E-03 .1542 5.153E-03 .1488 3.415E-03  
 S 4547(100) 20.17 19.05 4.136E-03 .1195 5.330E-03 .1542 5.153E-03 .1488 3.415E-03  
 M 4830(100) 21.47 19.09 4.136E-03 .1155 5.330E-03 .1542 5.153E-03 .1488 3.415E-03  
 T 909(100) 21.47 20.15 4.026E-03 .1163 5.198E-03 .1501 5.017E-03 .1449 3.323E-03  
 S 4544(100) 21.45 20.17 4.024E-03 .1162 5.195E-03 .1500 5.013E-03 .1448 3.322E-03  
 M 4531(100) 21.45 20.17 4.024E-03 .1162 5.195E-03 .1500 5.013E-03 .1448 3.322E-03  
 T 910(100) 22.50 21.22 3.923E-03 .1133 5.065E-03 .1463 4.898E-03 .1412 3.238E-03  
 S 4549(100) 22.50 21.22 3.923E-03 .1133 5.065E-03 .1463 4.898E-03 .1412 3.238E-03  
 M 4549(100) 22.53 21.25 3.920E-03 .1132 5.062E-03 .1462 4.895E-03 .1411 3.236E-03  
 T 911(100) 23.10 22.42 3.816E-03 .1102 4.927E-03 .1423 4.756E-03 .1373 3.151E-03  
 S 4533(100) 23.10 22.42 3.816E-03 .1102 4.927E-03 .1423 4.756E-03 .1373 3.151E-03  
 M 4533(100) 23.73 22.45 3.814E-03 .1102 4.924E-03 .1422 4.752E-03 .1373 3.149E-03  
 T 912(100) 25.75 24.45 3.655E-03 .1055 4.718E-03 .1363 4.554E-03 .1315 3.016E-03  
 S 4591(100) 25.75 24.45 3.653E-03 .1055 4.714E-03 .1362 4.551E-03 .1315 3.016E-03  
 T 913(100) 27.78 26.50 3.510E-03 .1013 4.532E-03 .1308 4.374E-03 .1263 2.896E-03  
 S 4592(100) 27.78 26.50 3.510E-03 .1013 4.532E-03 .1308 4.374E-03 .1263 2.896E-03  
 M 4535(100) 27.78 26.50 3.510E-03 .1013 4.532E-03 .1308 4.374E-03 .1263 2.896E-03  
 MODEL HAS LEFT CENTERLINE  
 T 914(100) 24.53 24.53 3.343E-03 .0974 4.364E-03 .1240 4.215E-03 .1216 2.787E-03  
 S 4593(100) 24.53 24.53 3.343E-03 .0974 4.364E-03 .1240 4.215E-03 .1216 2.787E-03  
 M 4536(100) 24.60 28.61 3.379E-03 .0976 4.372E-03 .1259 4.210E-03 .1215 2.787E-03

Group 108  
76 86  
ms

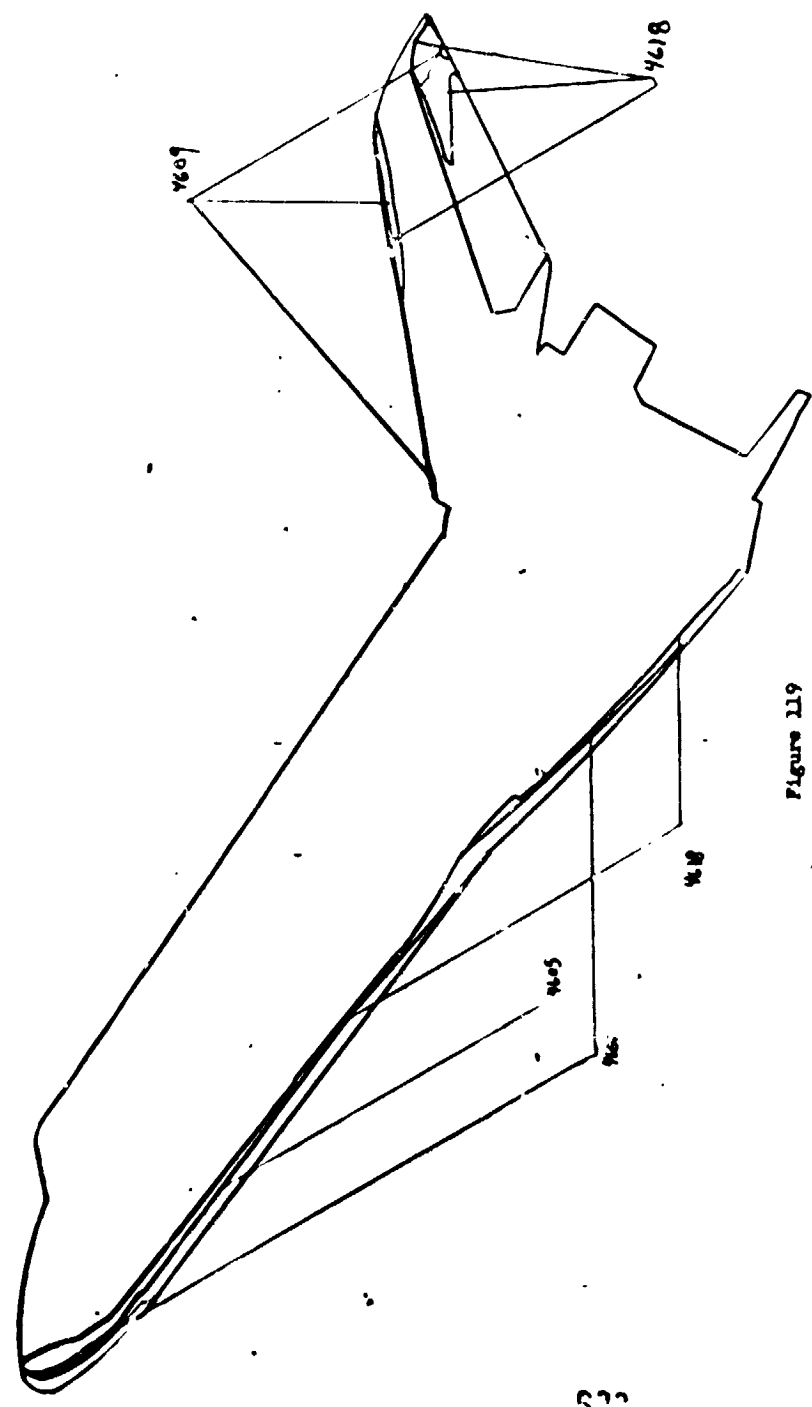


Figure 119

Comp 100  
8194  
105

4531  
 $\alpha = 35^\circ$   
 $\phi = 0^\circ$

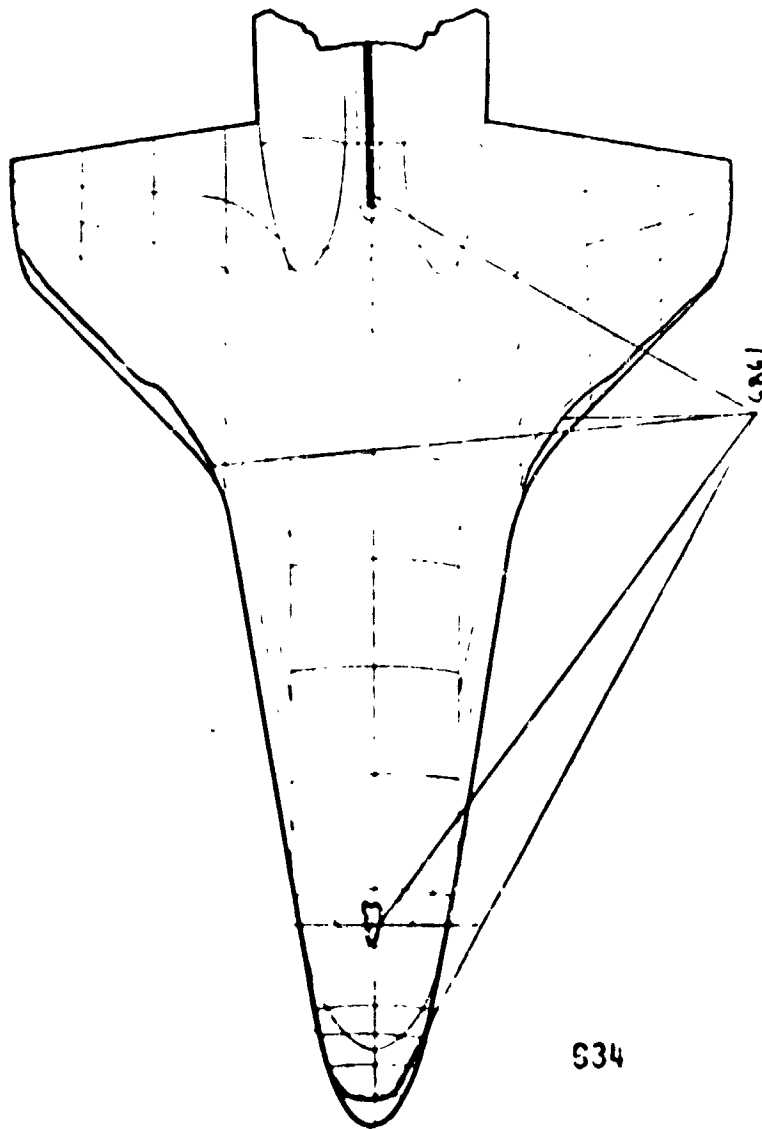


Figure 120



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7/10/73

NASA-R1 WRITER BEATING

VAPR9

AEDC(ARO-INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL R

GROUP	CONFIG	MODEL	MACH NO	PO(PSTA)	TO(DEG P)	ALPHA-MODEL	ALPHA-SECTOR	ALPHA-PREBEND	ROLL-MODEL	YAW
100	2	ORBITER S	7.97	425.0	1306	35.03	-5.03	-30.00	-180.00	-0.00
T-INF	P-INF	Q-INF	RQ-INF	W-INF	MU-INF	W/FT	HREF	STREF		
(DEG R)	(PSIA)	(FT/SEC)	(SLUGS/FT <sup>3</sup> )	(FT/SEC)	(FT/SEC)	(FT/SEC)	(FT/SEC)	(FT/SEC)		
95.3	0.05	1.993	3813	3.926E-05	7.675E-09	1.550E-06	3.462E-02	2.911E-02		
CAMERA	ROLL NO	PAINT TEMP (DEG F)	INITIAL TEMP (DEG F)	SQUARE ROOT (RHO/CAK)	TRAR(TO)	BETA(TO)				
TOP(7)	7916									
SIDF(S)	7686	250	81	0.0535	0	0				
WITCH(R)	8194									

PIC NO	TIME DELTIME	H(TO)	HREF	H(9TO)	H(9TO)/HREF	H(923TO)	H(923TO)/HREF	ST(TO)
T 915(250)	1.16	MODEL HAS NOT REACHED CENTERLINE						
S 4594(250)	1.18	MODEL HAS NOT REACHED CENTERLINE						
M 633(250)	1.18	MODEL HAS NOT REACHED CENTERLINE						
T 633(250)	2.23	MODEL HAS NOT REACHED CENTERLINE						
T 416(250)	2.25	MODEL HAS NOT REACHED CENTERLINE						
S 4595(250)	2.25	MODEL HAS NOT REACHED CENTERLINE						
INJECT TIME	2.30	DATA NOT YET VALID						
T 433(250)	3.20	DATA NOT YET VALID						
T 911(250)	3.23	DATA NOT YET VALID						
S 4596(250)	3.33	DATA NOT YET VALID						
T 918(250)	4.38	7.252E-03	0.2095	9.172E-03	0.2649	8.639E-03	0.2495	6.004E-03
S 4597(250)	4.38	7.252E-03	0.2095	9.172E-03	0.2649	8.639E-03	0.2495	6.004E-03
M 640(250)	4.38	7.252E-03	0.2095	9.172E-03	0.2649	8.639E-03	0.2495	6.004E-03
S 4598(250)	5.46	6.245E-03	0.1403	7.898E-03	0.2281	7.439E-03	0.2148	5.168E-03
M 684(250)	5.46	6.245E-03	0.1403	7.898E-03	0.2281	7.439E-03	0.2148	5.168E-03
S 4599(250)	6.21	5.540E-03	0.1511	7.057E-03	0.2038	6.647E-03	0.1920	4.618E-03
M 642(250)	6.21	5.540E-03	0.1511	7.057E-03	0.2038	6.647E-03	0.1920	4.618E-03
S 4600(250)	7.53	5.101E-03	0.1473	6.431E-03	0.1859	6.064E-03	0.1751	4.212E-03
T 919(250)	8.58	4.719E-03	0.1362	5.948E-03	0.1723	5.621E-03	0.1623	3.903E-03
S 4601(250)	8.58	4.719E-03	0.1362	5.948E-03	0.1723	5.621E-03	0.1623	3.903E-03
M 644(250)	8.61	4.711E-03	0.1360	5.958E-03	0.1721	5.612E-03	0.1621	3.898E-03
S 4602(250)	9.64	4.412E-03	0.1274	5.579E-03	0.1611	5.255E-03	0.1517	3.650E-03
T 920(250)	9.66	4.405E-03	0.1272	5.571E-03	0.1609	5.247E-03	0.1515	3.644E-03
S 4603(250)	10.09	4.157E-03	0.1200	5.259E-03	0.1518	4.952E-03	0.1436	3.439E-03
T 921(250)	10.71	4.152E-03	0.1199	5.251E-03	0.1516	4.946E-03	0.1428	3.436E-03

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7/10/73

NASA-RI ORBITER PEATING

AEDCIARO, INC.) ARNOLD AFS, TENNESSEE  
VON KARMAN GAS DYNAMICS FACILITY  
50 INCH HYPERSONIC TUNNEL R

VA289

GROUP CAMFIG MODEL MACH NO POI(PSTA) TO( DEG R) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREBEND ROLL-MODEL YAW

100 2 ORBITER S 7.97 425.3 1306 35.03 -5.03 -30.00 -190.00 -0.00

T-INF P-INF O-INF V-INF RHO-INF MU-INF RE/FT MREF STREF

(DEG R) (PSIA) (PSIA) (FT/SEC) (SLUGS/FT<sup>3</sup>) (LR-SEC/FT<sup>2</sup>) (FT-1) (R= .0175EI) (R= .0175EI)

95.3 .045 1.985 3813 3.0229E-05 7.674E-08 1.952E 06 3.443E-02 2.910E-02

CAMERA ROLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHOXCK) TRAR(TO) BETA(TO)

TOP(T) 7016 81 0.0535 2.208E-01 2.3.18E-01

SIDE(S) 7686

MOTTON(R) 8194

PTC NO	TIME DELTIME	H(TO)	H(TO)/MREF	H(.9TO)	H(.9TO)/MREF	H(.923TO)	H(.923TO)/MREF	ST(TO)
R 4447(250)	11.74 10.45	3.943E-03	.1138	4.986E-03	.1440	4.697E-03	.1356	3.261E-03
S 4604(250)	11.76 10.47	3.938E-03	.1137	4.980E-03	.1438	4.611E-03	.1354	3.257E-03
M 4648(250)	12.79 11.50	3.758E-03	.1085	4.753E-03	.1372	4.471E-03	.1292	3.108E-03
S 4605(250)	12.81 11.52	3.754E-03	.1084	4.748E-03	.1371	4.472E-03	.1291	3.105E-03
M 4649(250)	13.84 12.55	3.597E-03	.1039	4.550E-03	.1313	4.285E-03	.1237	2.975E-03
S 4606(250)	13.87 12.57	3.594E-03	.1037	4.545E-03	.1312	4.281E-03	.1236	2.972E-03
M 4650(250)	14.89 13.60	3.455E-03	.0998	4.370E-03	.1262	4.116E-03	.1188	2.857E-03
S 4607(250)	14.92 13.62	3.452E-03	.0996	4.366E-03	.1260	4.112E-03	.1187	2.854E-03
M 4651(250)	15.94 14.65	3.329E-03	.0961	4.211E-03	.1216	3.966E-03	.1145	2.754E-03
S 4608(250)	15.97 14.68	3.326E-03	.0960	4.207E-03	.1214	3.962E-03	.1144	2.750E-03
M 4652(250)	16.99 15.70	3.216E-03	.0928	4.067E-03	.1174	3.831E-03	.1106	2.659E-03
S 4610(250)	16.99 15.70	3.216E-03	.0928	4.067E-03	.1174	3.831E-03	.1106	2.659E-03
M 4653(250)	18.05 16.75	3.113E-03	.0899	3.937E-03	.1137	3.709E-03	.1070	2.574E-03
S 4611(250)	18.05 16.75	3.113E-03	.0899	3.937E-03	.1137	3.709E-03	.1070	2.574E-03
M 4654(250)	19.10 17.80	3.020E-03	.0872	3.819E-03	.1102	3.597E-03	.1038	2.497E-03
S 4612(250)	19.10 17.80	3.020E-03	.0872	3.819E-03	.1102	3.597E-03	.1038	2.497E-03
M 4655(250)	20.15 18.84	2.945E-03	.0847	3.711E-03	.1071	3.496E-03	.1009	2.426E-03
S 4613(250)	20.15 18.84	2.945E-03	.0847	3.711E-03	.1071	3.496E-03	.1009	2.426E-03
M 4656(250)	21.20 19.91	2.856E-03	.0824	3.612E-03	.1043	3.402E-03	.0982	2.361E-03
S 4614(250)	21.20 19.91	2.856E-03	.0824	3.612E-03	.1043	3.402E-03	.0982	2.361E-03
M 4657(250)	22.25 20.94	2.743E-03	.0803	3.520E-03	.1016	3.316E-03	.0957	2.300E-03
S 4615(250)	22.25 20.94	2.743E-03	.0803	3.520E-03	.1016	3.316E-03	.0957	2.300E-03
M 4658(250)	23.30 22.01	2.716E-03	.0784	3.435E-03	.0991	3.236E-03	.0934	2.245E-03
S 4616(250)	23.30 22.01	2.716E-03	.0784	3.435E-03	.0991	3.236E-03	.0934	2.245E-03
M 4659(250)	24.35 23.07	2.654E-03	.0766	3.356E-03	.0968	3.161E-03	.0912	2.192E-03
S 4617(250)	24.35 23.07	2.654E-03	.0766	3.356E-03	.0968	3.161E-03	.0912	2.192E-03

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7/10/73

NASA-RJ ORBITER HEATING  
 VA299  
 AEDC(ARJ-INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL R

GROUP CONFIG MODEL MACH NO PO (PSIA) TO (DEG R) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREBEND ROLL-MODEL YAW  
 100 2 ORBITER S 7.97 426.0 1306 35.03 -5.03 -30.00 -180.00 -0.00  
 T-INF P-INF Q-INF V-INF MU-INF RMU-INF HU-INF RF/FT HREF STREF  
 (DEG R) (PSIA) (FI/SEC) (SLUGS/FI3) (LB-SEC/FI2) (FI-1) (R= .0175EI) (R= .0175EI)  
 95.3 .045 1.928 3813 3.975E-05 7.675E-08 1.455E 06 3.466E-02 2.907E-02  
 CAMERA ROLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RMXCKX) TBAR(10) BETA(10)  
 TOP(1) 7916  
 SLOF(S) 7686 250 .0535 2.208E-01 2.3818E-01  
 BOTTOM(R) 8194

PIC NO TIME DELTIME HIT0 HIT0/HREF M(070)/HREF M( .923T0) M( .923T0)/HREF ST(10)  
 S 4517(250) 25.40 24.11 2.545E-03 .0749 3.282E-03 .0947 3.091E-03 .0892 2.145E-03  
 M 4560(250) 25.40 24.11 2.545E-03 .0749 3.282E-03 .0947 3.091E-03 .0892 2.145E-03  
 S 4518(250) 26.46 25.16 2.540E-03 .0733 3.213E-03 .0927 3.026E-03 .0873 2.098E-03  
 M 4561(250) 26.46 25.16 2.540E-03 .0733 3.213E-03 .0927 3.026E-03 .0873 2.098E-03  
 V 20(250) 27.48 26.19 2.490E-03 .0718 3.149E-03 .0909 2.966E-03 .0856 2.057E-03  
 S 4614(250) 27.51 26.21 2.490E-03 .0718 3.149E-03 .0908 2.965E-03 .0855 2.056E-03  
 M 4662(250) 27.51 26.21 2.490E-03 .0718 3.149E-03 .0908 2.965E-03 .0855 2.056E-03  
 MODEL HAS LEFT CENTERLINE  
 T 921(250) 28.53 27.24 2.441E-03 .0704 3.088E-03 .0891 2.908E-03 .0839 2.017E-03  
 S 4620(250) 28.53 27.24 2.441E-03 .0704 3.088E-03 .0891 2.908E-03 .0839 2.017E-03  
 M 4663(250) 28.56 27.27 2.440E-03 .0704 3.086E-03 .0891 2.907E-03 .0839 2.016E-03  
 M 4664(250) 29.58 28.20 2.396E-03 .0691 3.030E-03 .0874 2.854E-03 .0823 1.979E-03  
 S 4621(250) 29.61 28.32 2.395E-03 .0691 3.029E-03 .0874 2.853E-03 .0823 1.978E-03

402

Group 101  
7686  
no

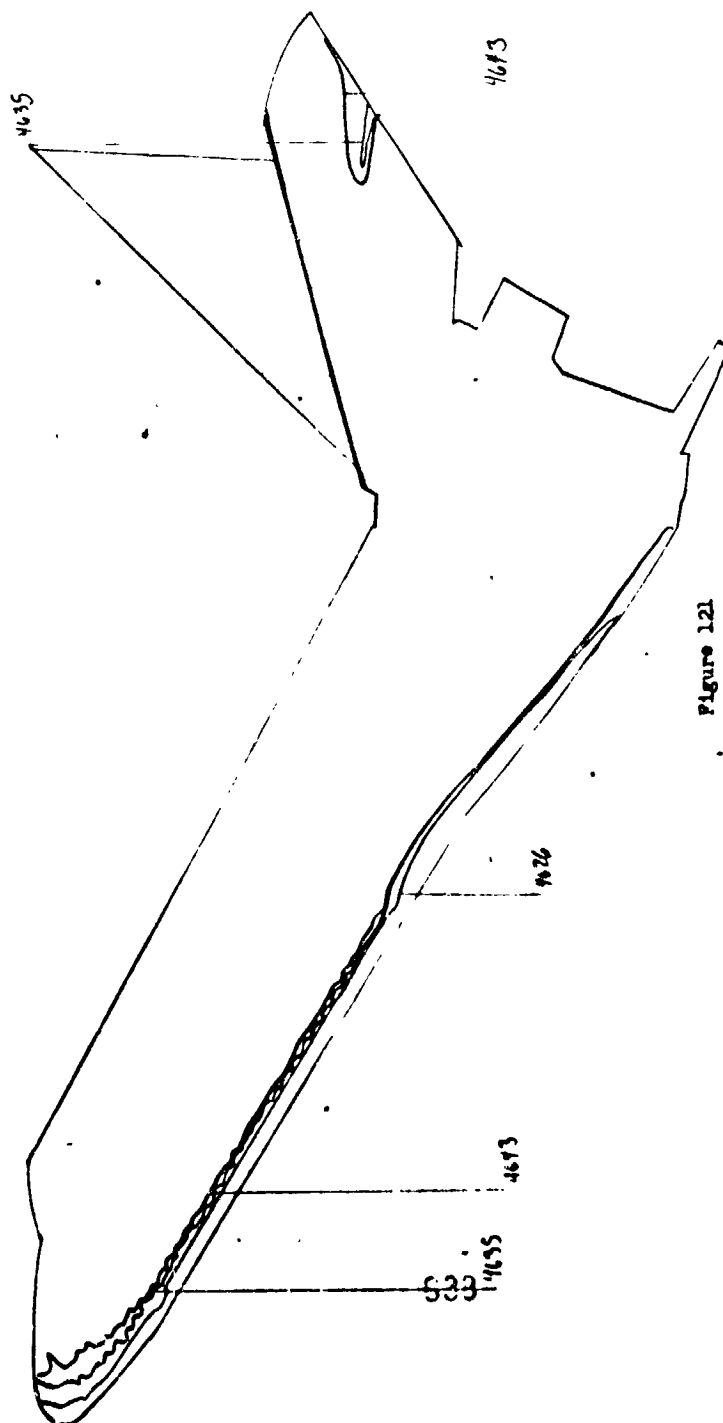
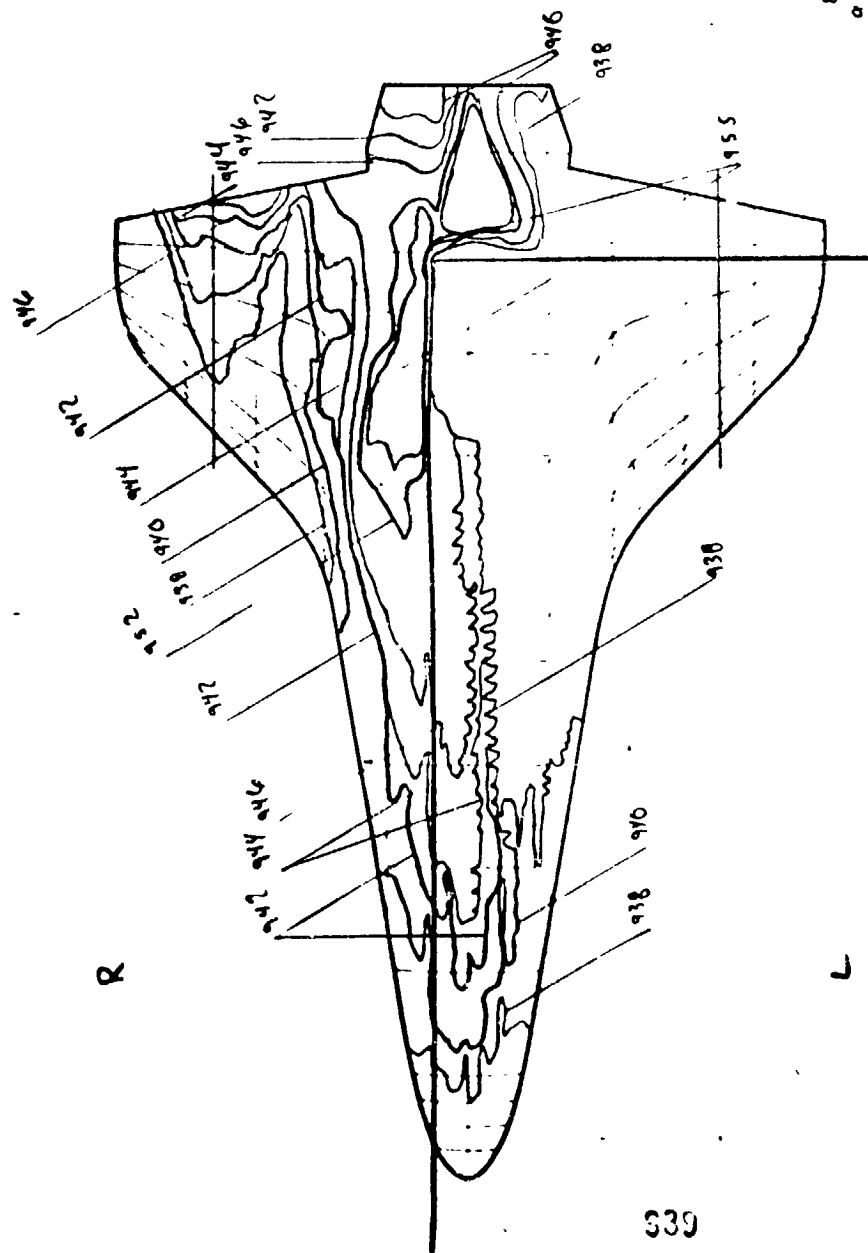


Figure 121

Group 101  
8094  
mo



8595  
 $\alpha = 30^\circ$   
 $\phi = 0^\circ$

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7/10/73

AEDC(ARO,INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL B

NASA-RI ORBITER HEATING

VA2RQ

GROUP CONFIG MODEL MACH NO PROPSIA) TO( DEG R) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREBEND ROLL-MODEL YAM  
 101 4 ORBITER R3 7.97 423.8 1307 30.02 -0.02 -30.00 -180.00 -0.00  
 T-INF P-INF Q-INF V-INF MU-INF MU-INF RE/FT MREF SREF (R= .0175E) (R= .0175E)  
 (DEG R) (PSIA) (FT/SEC) (SLUGS/FT3) (LBS-SEC/FT3) (FJ-1) (FJ-1) (R= .0175E) (R= .0175E)  
 95.4 .044 1.978 3814 3.912E-05 7.681E-08 1.943E 06 3.457E-02 2.916E-02  
 CAMERA ROLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHUXCK) TRAR(TO) BETA(TO)  
 TOP(T) 8094 80 0.0519 0 0  
 SIDE(S) 7686  
 MOTT(M) 8194

PIC NO TIME DELTIME HITO) H(TO)/MREF H(.910) H(.912TO) M(.912TO)/MREF ST(TO)  
 T 935(200) 1.18 MODEL HAS NOT REACHED CENTERLINE H(.910) H(.912TO) M(.912TO)/MREF ST(TO)  
 S 4622(200) 1.18 MODEL HAS NOT REACHED CENTERLINE  
 M 4665(200) 1.18 MODEL HAS NOT REACHED CENTERLINE  
 T 4666(200) 2.23 MODEL HAS NOT REACHED CENTERLINE  
 S 936(200) 2.25 MODEL HAS NOT REACHED CENTERLINE  
 M 4623(200) 2.25 MODEL HAS NOT REACHED CENTERLINE  
 INJECT TIME = 2.28  
 T 937(200) 3.30 DATA NOT YET VALID  
 M 4667(200) 3.30 DATA NOT YET VALID  
 T 938(200) 4.38 3.10 5.403E-03 .1351 5.403E-03 .1478 5.633E-03 .1629 3.888E-03  
 S 4625(200) 4.38 3.10 4.670E-03 .1351 5.403E-03 .1478 5.633E-03 .1629 3.888E-03  
 M 4644(200) 4.38 3.10 4.670E-03 .1351 5.403E-03 .1478 5.633E-03 .1629 3.888E-03  
 T 539(200) 5.43 4.15 4.033E-03 .1167 5.015E-03 .1450 4.868E-03 .1408 3.359E-03  
 M 4668(200) 5.43 4.15 4.033E-03 .1167 5.015E-03 .1450 4.868E-03 .1408 3.359E-03  
 T 4626(200) 5.46 4.18 4.024E-03 .1163 5.000E-03 .1446 4.854E-03 .1403 3.349E-03  
 S 540(200) 6.51 5.23 3.547E-03 .1049 4.470E-03 .1292 4.338E-03 .1254 2.993E-03  
 M 4670(200) 6.51 5.23 3.547E-03 .1049 4.470E-03 .1292 4.338E-03 .1254 2.993E-03  
 T 4671(200) 7.56 6.28 3.262E-03 .0949 4.078E-03 .1179 3.959E-03 .1144 2.731E-03  
 M 4672(200) 7.56 6.31 3.275E-03 .0947 4.070E-03 .1177 3.951E-03 .1142 2.726E-03  
 T 4629(200) 7.58 6.31 3.275E-03 .0947 4.070E-03 .1177 3.951E-03 .1142 2.726E-03  
 S 4629(200) 8.53 7.34 3.032E-03 .0877 3.768E-03 .1058 3.658E-03 .1058 2.524E-03  
 M 4672(200) 8.53 7.34 3.032E-03 .0877 3.768E-03 .1058 3.658E-03 .1058 2.524E-03  
 T 542(200) 8.56 7.33 3.027E-03 .0875 3.762E-03 .1056 3.651E-03 .1056 2.519E-03  
 M 4673(200) 9.59 8.41 2.837E-03 .0820 3.525E-03 .1019 3.421E-03 .0949 2.361E-03

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7/10/73

NASA-RI ORBITER PLATING AEDC(ARN-INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL R

VA2RQ

GROUP CONFIG MODEL MACH NO POI(PSIA) TO(DEG R) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREBEND ROLL-MODEL YAW  
 101 6 ORBITER R3 7.97 424.1 1307 30.02 -0.02 -30.00 -180.00 -0.00

T-INF P-INF Q-INF V-INF W-INF RF/FT STREF  
 (DEG R) (PSIA) (FT/SEC) (SLUGS/FT<sup>3</sup>) (LB-SEC/FT<sup>2</sup>) (FI-1) (R= .0175FI) (R= .0175FI)  
 95.4 .145 1.979 3815 3.914E-05 7.681E-08 1.944E-06 3.459E-02 2.915E-02

CAMERA ROLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RMSEXCK) TRAN(ITO) BETA(ITO)  
 TOP(T) 8094  
 SIDE(S) 7686 200 90 .0519 1.564E-01 1.5847E-01  
 BOTTOM(B) 8194

PIC NO TIME DELTIME H(ITO) H(ITO)/HREF H(.910) H(.910)/HREF H(.912TO) HREF ST(ITO)  
 T 943(1200) 9.71 8.43 2.832E-03 .0819 3.520E-03 .1018 3.416E-03 .0988 2.358E-03  
 S 4630(1200) 9.71 8.43 2.832E-03 .0819 3.520E-03 .1018 3.416E-03 .0988 2.358E-03  
 T 944(1200) 10.76 9.48 2.671E-03 .0772 3.319E-03 .0959 3.221E-03 .0931 2.222E-03  
 S 4631(1200) 10.76 9.48 2.671E-03 .0772 3.319E-03 .0959 3.221E-03 .0931 2.222E-03  
 T 945(1200) 11.81 10.53 2.534E-03 .0733 3.149E-03 .0910 3.056E-03 .0884 2.109E-03  
 S 4632(1200) 11.81 10.53 2.534E-03 .0733 3.149E-03 .0910 3.056E-03 .0884 2.109E-03  
 T 946(1200) 11.84 10.54 2.531E-03 .0732 3.145E-03 .0899 3.053E-03 .0882 2.106E-03  
 S 4633(1200) 11.84 10.54 2.531E-03 .0732 3.145E-03 .0899 3.053E-03 .0882 2.106E-03  
 T 947(1200) 12.69 11.61 2.414E-03 .0698 2.999E-03 .0867 2.911E-03 .0842 2.008E-03  
 S 4634(1200) 12.69 11.61 2.414E-03 .0698 2.999E-03 .0867 2.911E-03 .0842 2.008E-03  
 T 948(1200) 13.44 12.64 2.311E-03 .0668 2.709E-03 .0840 2.788E-03 .0806 1.922E-03  
 S 4635(1200) 13.44 12.64 2.311E-03 .0668 2.709E-03 .0840 2.788E-03 .0806 1.922E-03  
 T 949(1200) 13.57 12.69 2.309E-03 .0654 2.699E-03 .0829 2.785E-03 .0805 1.921E-03  
 S 4636(1200) 13.57 12.69 2.309E-03 .0654 2.699E-03 .0829 2.785E-03 .0805 1.921E-03  
 T 950(1200) 15.02 13.74 2.219E-03 .0641 2.575E-03 .0797 2.676E-03 .0774 1.846E-03  
 S 4637(1200) 15.02 13.74 2.219E-03 .0641 2.575E-03 .0797 2.676E-03 .0774 1.846E-03  
 T 951(1200) 15.07 14.79 2.139E-03 .0619 2.458E-03 .0768 2.580E-03 .0746 1.779E-03  
 S 4638(1200) 15.07 14.79 2.139E-03 .0619 2.458E-03 .0768 2.580E-03 .0746 1.779E-03  
 T 952(1200) 16.09 14.81 2.137E-03 .0619 2.455E-03 .0767 2.577E-03 .0745 1.777E-03  
 S 4639(1200) 16.09 14.81 2.137E-03 .0619 2.455E-03 .0767 2.577E-03 .0745 1.777E-03  
 T 953(1200) 17.12 15.84 2.065E-03 .0597 2.366E-03 .0742 2.491E-03 .0720 1.717E-03  
 S 4640(1200) 17.12 15.84 2.065E-03 .0597 2.366E-03 .0742 2.491E-03 .0720 1.717E-03  
 T 954(1200) 17.14 15.87 2.065E-03 .0597 2.366E-03 .0742 2.491E-03 .0720 1.717E-03  
 S 4641(1200) 17.14 15.87 2.065E-03 .0597 2.366E-03 .0742 2.491E-03 .0720 1.717E-03  
 T 955(1200) 18.00 16.92 2.000E-03 .0574 2.485E-03 .0718 2.412E-03 .0697 1.662E-03  
 S 4642(1200) 18.00 16.92 2.000E-03 .0574 2.485E-03 .0718 2.412E-03 .0697 1.662E-03

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7/10/73

NASA-RI ORBITER HEATING

AEDC(ARO-INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL R

VA289

GROUP CONFIG MODEL MACH NO PO(P/SIA) TO(DEG R) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREBEND ROLL-MODEL YAW  
 101 6 ORBITER R3 7.97 424.6 1307 30.02 -0.02 -30.00 -180.00 -0.00  
 7-IAF P-INF O-INF V-INF MU-INF MU-INF RE/FT MREF STREF  
 IDEG R1 (P/SIA) (FI/SEC) (SLUGS/FI3) (LB-SEC/FI2) (FI-1) (R= .0175FI) (R= .0175FI)  
 95.4 .045 1.982 3814 3.020E-05 7.680E-08 1.547E 06 3.460E-02 2.913E-02  
 CAMERA ROLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHOXCKX) TRAHI(TO) BETA(TO)  
 TOP(1) 8094  
 SIZE(SI) 7680 200 .0519 1.564E-01 1.5847E-01  
 MOTION(R) 8194

PIC NO TYPE DELTIME H1(0) H1(TO)/HREF H1(9TO) HREF H1(912TO) H1(912TO)/HREF ST(IG) ST(IG)  
 S 4636(200) 18.22 16.94 1.998E-03 .0577 2.483E-03 .0718 2.410E-03 .0696 1.661E-03  
 T 952(200) 19.27 17.99 1.939E-03 .0560 2.409E-03 .0696 2.339E-03 .0676 1.612E-03  
 S 4630(200) 19.27 17.99 1.939E-03 .0560 2.409E-03 .0696 2.339E-03 .0676 1.612E-03  
 M 4642(200) 19.27 17.99 1.939E-03 .0560 2.409E-03 .0696 2.339E-03 .0676 1.612E-03  
 M 4643(200) 20.22 18.04 1.855E-03 .0544 2.322E-03 .0677 2.273E-03 .0657 1.566E-03  
 T 953(200) 20.25 18.07 1.843E-03 .0544 2.340E-03 .0676 2.272E-03 .0656 1.566E-03  
 S 4640(200) 20.25 18.07 1.843E-03 .0544 2.340E-03 .0676 2.272E-03 .0656 1.566E-03  
 T 954(200) 21.40 20.12 1.844E-03 .0530 2.278E-03 .0658 2.212E-03 .0639 1.524E-03  
 S 4641(200) 21.40 20.12 1.844E-03 .0530 2.278E-03 .0658 2.212E-03 .0639 1.524E-03  
 M 4644(200) 21.40 20.12 1.844E-03 .0530 2.278E-03 .0658 2.212E-03 .0639 1.524E-03  
 M 4645(200) 22.45 21.17 1.747E-03 .0516 2.221E-03 .0642 2.156E-03 .0623 1.485E-03  
 T 955(200) 22.48 21.20 1.746E-03 .0516 2.220E-03 .0641 2.155E-03 .0623 1.485E-03  
 S 4642(200) 22.48 21.20 1.746E-03 .0516 2.220E-03 .0641 2.155E-03 .0623 1.485E-03  
 M 4646(200) 24.38 23.10 1.711E-03 .0494 2.127E-03 .0614 2.071E-03 .0596 1.422E-03  
 T 956(200) 24.40 23.12 1.710E-03 .0494 2.125E-03 .0614 2.070E-03 .0596 1.422E-03  
 S 4643(200) 24.40 23.12 1.710E-03 .0494 2.125E-03 .0614 2.069E-03 .0596 1.422E-03  
 S 4644(200) 26.41 25.14 1.641E-03 .0474 2.039E-03 .0589 1.978E-03 .0571 1.363E-03  
 T 957(200) 26.43 25.15 1.640E-03 .0474 2.038E-03 .0589 1.978E-03 .0571 1.363E-03  
 S 4645(200) 26.43 25.15 1.640E-03 .0474 2.038E-03 .0589 1.978E-03 .0571 1.363E-03  
 MODEL HAS LEFT CENTERLINE  
 T 958(200) 26.46 27.18 1.578E-03 .0456 1.940E-03 .0566 1.903E-03 .0550 1.311E-03  
 S 4645(200) 26.46 27.18 1.578E-03 .0456 1.940E-03 .0566 1.903E-03 .0550 1.311E-03  
 M 4646(200) 28.46 27.18 1.578E-03 .0456 1.940E-03 .0566 1.903E-03 .0550 1.311E-03  
 T 959(200) 30.49 29.21 1.522E-03 .0440 1.891E-03 .0546 1.836E-03 .0530 1.264E-03  
 S 4646(200) 30.49 29.21 1.522E-03 .0440 1.891E-03 .0546 1.836E-03 .0530 1.264E-03  
 M 4649(200) 30.49 29.21 1.522E-03 .0440 1.891E-03 .0546 1.836E-03 .0530 1.264E-03

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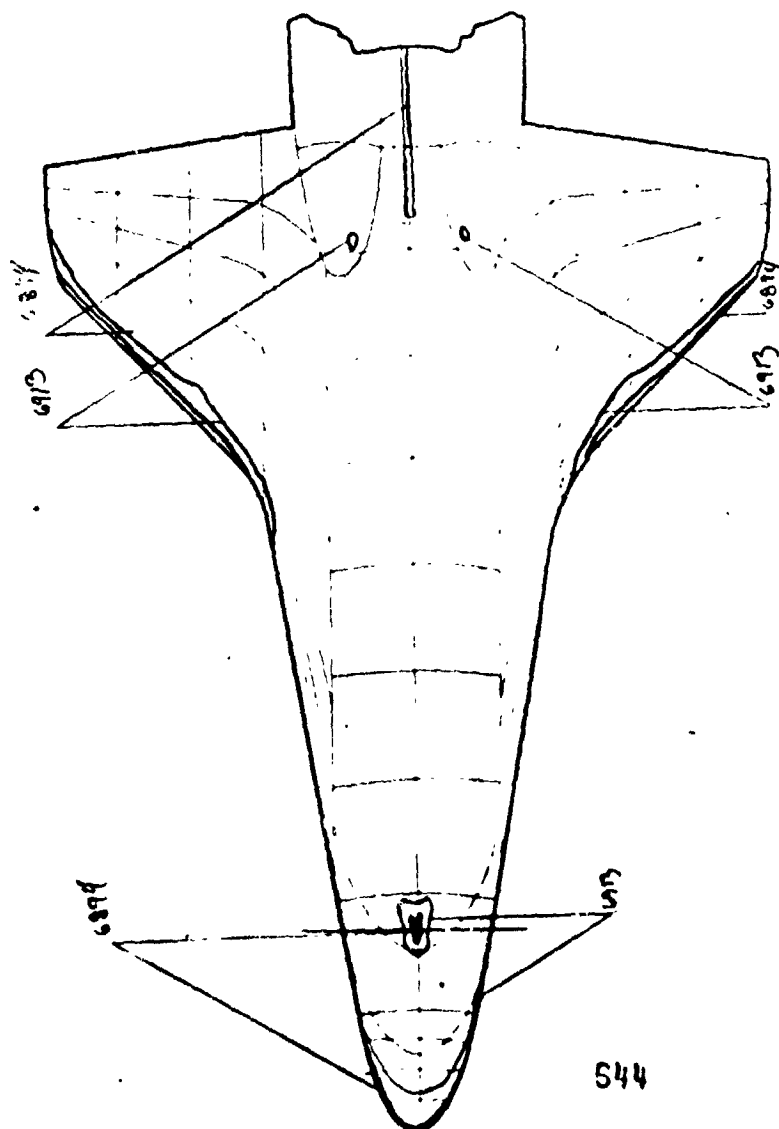
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Group 102  
8194  
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 7/10/77

NASA-RI ORBITER HEATING

AEDC (ARO, INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 SC INCH HYPERSONIC TUNNEL A

VA209

GROUP	CONFID	MODEL	MACH NO	POIP(SIA)	TO( DEG R)	ALPHA-MODEL	ALPHA-SECTION	ALPHA-PREEND	ROLL-MODEL	YAW
102	2	ORBITER S	7.97	424.3	1309	35.04	-5.04	-30.00	-180.00	--.00
T-INF	P-INF	Q-INF	V-INF	RHO-INF	MU-INF	RE/FT	HREF	STREF		
DFC M (PSIA)	(PSIA)	(FT/SEC)	(SLUGS/FT <sup>3</sup> )	(LBS-SEC/FT <sup>2</sup> )	(FT-1)	(R <sub>W</sub> -.0175FT)	(R <sub>W</sub> -.0175FT)			
95.5	-.045	1.990	3016	3.913E-05	7.644E-08	1.942E-05	3.440E-02	2.916E-02		
CAMERA	ROLL NO	PAINT TEMP (DEG F)	INITIAL TEMP (DEG F)	SQUARE ROOT (RHOXCHK)	TBAR(1.0)	BETA(1.0)				
TOP(1)	8094									
SIDE(1)	7686									
BOTTOM(0)	8194									

PTC NO	TIME	MELTIME	M(1.0)	M(1.0)/HREF	M(1.910)	M(1.92310)	M(1.92310)/HREF	ST(1.0)
T 9601(150)	1.18							
S 4471(150)	1.18							
M 4901(150)	1.18							
T 9611(150)	2.25							
S 4481(150)	2.25							
M 4911(150)	2.25							
INJECT TIME = 2.30								
T 9621(150)	3.30							
M 4921(150)	3.30							
S 4491(150)	3.30							
T 9631(150)	4.38	3.09	2.456E-03	.0709	3.010E-03	.0849	2.860E-03	.0826
S 4451(150)	4.38	3.09	2.456E-03	.0709	3.010E-03	.0849	2.860E-03	.0826
M 4931(150)	4.38	3.09	2.456E-03	.0709	3.010E-03	.0849	2.860E-03	.0826
T 9641(150)	5.43	4.14	2.115E-03	.0611	2.592E-03	.0749	2.463E-03	.0711
S 4451(150)	5.43	4.14	2.115E-03	.0611	2.592E-03	.0749	2.463E-03	.0711
M 4941(150)	5.43	4.14	2.115E-03	.0611	2.592E-03	.0749	2.463E-03	.0711
T 9651(150)	6.51	5.21	1.890E-03	.0546	2.316E-03	.0649	2.200E-03	.0616
S 4452(150)	6.51	5.21	1.890E-03	.0546	2.316E-03	.0649	2.200E-03	.0616
M 4951(150)	6.51	5.21	1.890E-03	.0546	2.316E-03	.0649	2.200E-03	.0616
T 9661(150)	7.54	6.29	1.721E-03	.0497	2.109E-03	.0609	2.003E-03	.0579
S 4453(150)	7.54	6.29	1.721E-03	.0497	2.109E-03	.0609	2.003E-03	.0579
M 4961(150)	7.54	6.29	1.721E-03	.0497	2.109E-03	.0609	2.003E-03	.0579
T 9671(150)	8.63	7.34	1.593E-03	.0460	1.952E-03	.0564	1.854E-03	.0535
S 4454(150)	8.63	7.34	1.593E-03	.0460	1.952E-03	.0564	1.854E-03	.0535
M 4971(150)	8.63	7.34	1.593E-03	.0460	1.952E-03	.0564	1.854E-03	.0535
T 9681(150)	9.71	8.42	1.447E-03	.0429	1.823E-03	.0526	1.732E-03	.0500
S 4455(150)	9.71	8.42	1.447E-03	.0429	1.823E-03	.0526	1.732E-03	.0500
M 4981(150)	9.71	8.42	1.447E-03	.0429	1.823E-03	.0526	1.732E-03	.0500

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AEUC(ARO, INC.) ARNOLD AFS, TENNESSEE  
VON KARMAN GAS DYNAMICS FACILITY  
50 INCH HYPERSONIC TUNNEL #

WA209

T-CAF	P-CAF	Q-CAF	Y-CAF	RWQ-CAF	DE/FT	WREF	STREF
(0.0, 0)	(0.514)	(0.514)	(FT/SEC)	(SLUGS/FT)	(1.0-SEC/FT)	(0.0175FT)	(0.0175FT)

CAMERA	ROLL NO	PAINT	TEMP (DEG F)	INITIAL TEMP (DEG F)	SQUARE ROOT (RHOCXK)	YVAR(TC)	BETA(TO)
1	1	1	1	1	1	1	1

[illegible]

PTC NO	TIME	DELTIME	MT(0)	M(0)/MREF	M(0T0)	M(0T0)/MREF	MI	MI .923T0	MI .923T0/MREF	ST(0)		
T	97711501	19.22	18.87		1.016E-03	.0293		1.246E-03	.0359	1.183E-03	.0342	9.458E-04
S	46611501	19.22	18.83		1.016E-03	.0293		1.246E-03	.0359	1.183E-03	.0342	9.458E-04
T	97811501	20.27	19.88		9.879E-04	.0285		1.211E-03	.0349	1.150E-03	.0332	9.219E-04
S	46611501	20.27	19.88		9.879E-04	.0285		1.211E-03	.0349	1.150E-03	.0332	9.219E-04
M	90811501	20.27	19.88		9.879E-04	.0285		1.211E-03	.0349	1.150E-03	.0332	9.219E-04
T	97911501	21.45	20.16		9.612E-04	.0277		1.178E-03	.0340	1.119E-03	.0323	8.008E-04
S	46611501	21.45	20.16		9.612E-04	.0277		1.178E-03	.0340	1.119E-03	.0323	8.008E-04
M	90811501	21.45	20.16		9.612E-04	.0277		1.178E-03	.0340	1.119E-03	.0323	8.008E-04
T	98011501	22.50	21.21		9.371E-04	.0270		1.148E-03	.0331	1.091E-03	.0315	7.794E-04
M	46711501	22.50	21.21		9.371E-04	.0270		1.148E-03	.0331	1.091E-03	.0315	7.794E-04
T	98111501	23.58	22.28		9.12E-04	.0264		1.128E-03	.0323	1.064E-03	.0307	7.605E-04
M	46811501	23.58	22.28		9.12E-04	.0264		1.128E-03	.0323	1.064E-03	.0307	7.605E-04
T	98211501	24.63	23.34		8.913E-04	.0258		1.095E-03	.0316	1.040E-03	.0300	7.439E-04
M	46911501	24.63	23.34		8.913E-04	.0258		1.095E-03	.0316	1.040E-03	.0300	7.439E-04
T	98311501	25.70	24.41		8.734E-04	.0252		1.078E-03	.0309	1.017E-03	.0293	7.264E-04
M	47011501	25.70	24.41		8.734E-04	.0252		1.078E-03	.0309	1.017E-03	.0293	7.264E-04
T	98411501	26.73	26.44		8.547E-04	.0246		1.074E-03	.0309	1.016E-03	.0293	7.259E-04
M	47111501	26.73	26.44		8.547E-04	.0246		1.074E-03	.0309	1.016E-03	.0293	7.259E-04
MODEL HAS LEFT CENTERLINE												
T	98511501	27.71	26.41		8.347E-04	.0242		1.029E-03	.0297	9.777E-04	.0282	6.984E-04
M	47211501	27.71	26.41		8.347E-04	.0242		1.029E-03	.0297	9.777E-04	.0282	6.984E-04
T	98611501	28.73	28.44		8.202E-04	.0233		1.024E-03	.0286	9.722E-04	.0272	6.779E-04
M	47311501	28.73	28.44		8.202E-04	.0233		1.024E-03	.0286	9.722E-04	.0272	6.779E-04
T	98711501	29.73	28.44		8.042E-04	.0233		9.917E-04	.0286	9.422E-04	.0272	6.727E-04
M	47411501	29.73	28.44		8.042E-04	.0233		9.917E-04	.0286	9.422E-04	.0272	6.727E-04

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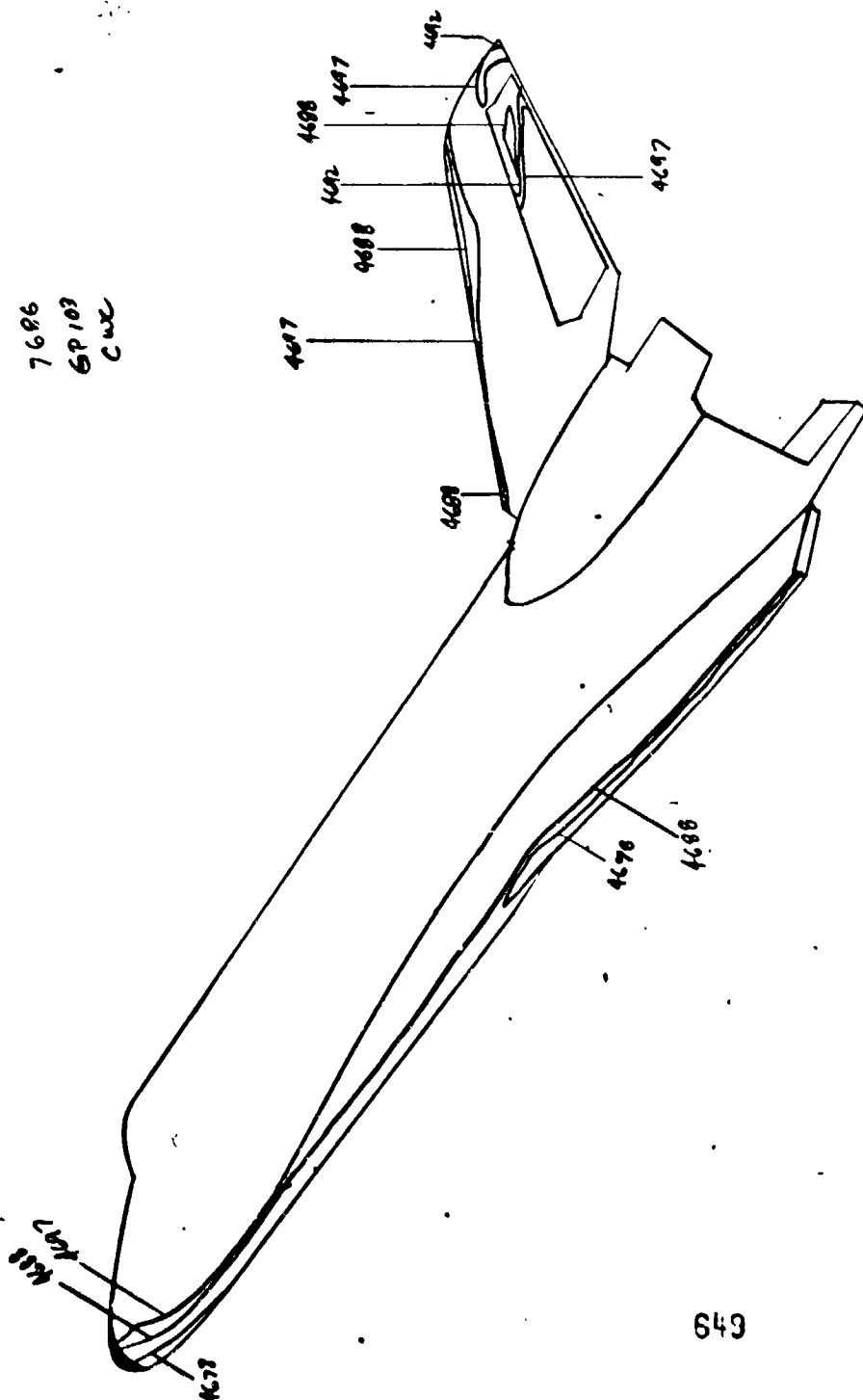


Figure 125





NASA-RI ORBITER HEATING  
 AEDC(ARO, INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL R  
 VAZAG  
 7/10/73  
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 \* UNCLASSIFIED \*  
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GROUP CONFIG MODEL MACH NO PO(PISA) TO(DEL R) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREBEND ROLL-MODEL YAM  
 103 4 CRITER R1 7.97 423.7 1310 35.04 -5.64 -30.00 -180.00 -0.00  
 T-INF P-INF Q-INF V-INF RMO-INF MU-INF RE/FT HREF STREF  
 (DEG R) (PSIA) (EI/SEC) (SLUGS/EI) (LB-SEC/EI) (EI-1) (RZ-0175EI) (HZ-0175EI)  
 95.6 .044 1.977 301R 3.903E-05 7.696E-08 1.937E 06 3.458E-02 2.920E-02  
 CAMERA ROLL NO PAINT IFMP (DEG F) INITIAL IEMP (DEG F) SQUARE ROOT (RHOACXK) TBAR(ITO) BETA(ITO)  
 TOP(IT) 8094  
 SIDF(S) 7646 200  
 MOTICHUR 8192 .0519 0 0

PIC NO	TIME DELTIME	H(ITO)	H(TOI)/HREF	H(.9TO)	H(.9TO)/HREF	H(.923TO)	H(.923TO)/HREF	ST(ITO)
M 6916(200)	1.15	MODEL HAS NOT REACHED CENTERLINE						
T 984(200)	1.18	MODEL HAS NOT REACHED CENTERLINE						
S 4673(200)	1.18	MODEL HAS NOT REACHED CENTERLINE						
T 987(200)	2.25	MODEL HAS NOT REACHED CENTERLINE						
S 4674(200)	2.25	MODEL HAS NOT REACHED CENTERLINE						
M 6917(200)	2.25	MODEL HAS NOT REACHED CENTERLINE						
INJECT TIME = 2.30								
T 988(200)	3.20	DATA NOT YET VALID						
M 6918(200)	3.20	DATA NOT YET VALID						
T 989(200)	4.38	4.662E-03	.1348	5.791E-03	.1675	5.482E-03	.1585	3.887E-03
M 6919(200)	4.38	4.662E-03	.1348	5.791E-03	.1675	5.482E-03	.1585	3.887E-03
S 4676(200)	4.41	4.644E-03	.1343	5.768E-03	.1668	5.460E-03	.1579	3.870E-03
T 990(200)	5.46	4.015E-03	.1160	4.987E-03	.1441	4.721E-03	.1364	3.345E-03
S 4677(200)	5.46	4.015E-03	.1160	4.987E-03	.1441	4.721E-03	.1364	3.345E-03
M 6920(200)	5.46	4.015E-03	.1160	4.987E-03	.1441	4.721E-03	.1364	3.345E-03
M 6921(200)	6.51	3.579E-03	.1035	4.445E-03	.1285	4.208E-03	.1217	2.983E-03
T 991(200)	6.53	3.579E-03	.1035	4.445E-03	.1285	4.208E-03	.1217	2.983E-03
S 4678(200)	6.53	3.266E-03	.0944	4.057E-03	.1173	3.840E-03	.1110	2.722E-03
T 992(200)	7.58	3.266E-03	.0944	4.057E-03	.1173	3.840E-03	.1110	2.722E-03
S 4679(200)	7.58	3.266E-03	.0944	4.057E-03	.1173	3.840E-03	.1110	2.722E-03
M 6922(200)	7.58	3.023E-03	.0874	3.755E-03	.1085	3.555E-03	.1028	2.519E-03
T 993(200)	8.63	3.023E-03	.0874	3.755E-03	.1085	3.555E-03	.1028	2.519E-03
M 6923(200)	8.63	3.023E-03	.0874	3.755E-03	.1085	3.555E-03	.1028	2.519E-03
S 4680(200)	8.66	3.018E-03	.0872	3.749E-03	.1084	3.549E-03	.1026	2.514E-03
T 994(200)	9.71	2.823E-03	.0816	3.507E-03	.1014	3.320E-03	.0960	2.352E-03
S 4681(200)	9.71	2.823E-03	.0816	3.507E-03	.1014	3.320E-03	.0960	2.352E-03
M 6924(200)	9.71	2.823E-03	.0816	3.507E-03	.1014	3.320E-03	.0960	2.352E-03

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NASA-RI ORBITER PEATING

AEDICAR, INC., ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL R

VA289

GROUP C NF16 MODEL MACH NO PO(P5IA) TO(EG R) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREBEND ROLL-MODEL YAW  
 103 4 ORBITER R1 7.97 424.1 1310 35.04 -5.04 -30.00 -180.00 -0.00

T-INF P-INF Q-INF W-INF RHO-INF MU-INF RE/FT HREF STREF  
 (DEG R) (PSIA) (PSIA) (PSIA) (SLUGS/FT<sup>3</sup>) (LBS/SEC/FT<sup>2</sup>) (FI-1) (H<sub>2</sub> -0.175FI)  
 95.6 0.45 1.979 381P 3.907E-05 7.595E-08 1.939E 06 3.460E-02 2.918E-02

CAMERA ROLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHOXCAK) TBAR(ITO) BETA(ITO)

TOP(IT) 8094  
 SIDE(SI) 7886 200 80 0.0519 1.559E-01 1.5784E-01  
 MOTION(MI) 8194

PIC NO	TIME DELT(SEC)	H(ITO)	H(ITO)/HREF	MI(9TO)	MI(9TO)/HREF	H(923TO)	H(923TO)/HREF	ST(ITO)
T 995(200)	10.76	9.47	2.662E-03	3.307E-03	0.0769	3.130E-03	0.0905	2.217E-03
M 995(200)	10.76	9.47	2.662E-03	3.307E-03	0.0769	3.130E-03	0.0905	2.217E-03
S 995(200)	10.76	9.47	2.662E-03	3.307E-03	0.0769	3.130E-03	0.0905	2.217E-03
T 996(200)	11.64	10.55	2.523E-03	3.133E-03	0.0729	2.966E-03	0.0857	2.101E-03
S 996(200)	11.64	10.55	2.523E-03	3.133E-03	0.0729	2.966E-03	0.0857	2.101E-03
M 996(200)	11.64	10.55	2.523E-03	3.133E-03	0.0729	2.966E-03	0.0857	2.101E-03
T 997(200)	12.89	11.64	2.404E-03	2.998E-03	0.0695	2.829E-03	0.0817	2.003E-03
S 997(200)	12.89	11.64	2.404E-03	2.998E-03	0.0695	2.829E-03	0.0817	2.003E-03
M 997(200)	12.89	11.64	2.404E-03	2.998E-03	0.0695	2.829E-03	0.0817	2.003E-03
T 998(200)	13.57	12.67	2.301E-03	2.858E-03	0.0655	2.704E-03	0.0782	1.917E-03
S 998(200)	13.57	12.67	2.301E-03	2.858E-03	0.0655	2.704E-03	0.0782	1.917E-03
M 998(200)	13.57	12.67	2.301E-03	2.858E-03	0.0655	2.704E-03	0.0782	1.917E-03
T 999(200)	15.04	13.75	2.209E-03	2.744E-03	0.0638	2.598E-03	0.0751	1.839E-03
S 999(200)	15.04	13.75	2.209E-03	2.744E-03	0.0638	2.598E-03	0.0751	1.839E-03
M 999(200)	15.04	13.75	2.209E-03	2.744E-03	0.0638	2.598E-03	0.0751	1.839E-03
T 1000(200)	16.09	14.84	2.129E-03	2.645E-03	0.0615	2.504E-03	0.0723	1.772E-03
S 1000(200)	16.09	14.84	2.129E-03	2.645E-03	0.0615	2.504E-03	0.0723	1.772E-03
M 1000(200)	16.09	14.84	2.129E-03	2.645E-03	0.0615	2.504E-03	0.0723	1.772E-03
T 1001(200)	17.17	15.82	2.058E-03	2.554E-03	0.0594	2.417E-03	0.0698	1.711E-03
S 1001(200)	17.17	15.82	2.058E-03	2.554E-03	0.0594	2.417E-03	0.0698	1.711E-03
M 1001(200)	17.17	15.82	2.058E-03	2.554E-03	0.0594	2.417E-03	0.0698	1.711E-03
T 1002(200)	18.22	16.92	1.941E-03	2.473E-03	0.0575	2.341E-03	0.0676	1.657E-03
S 1002(200)	18.22	16.92	1.941E-03	2.473E-03	0.0575	2.341E-03	0.0676	1.657E-03
M 1002(200)	18.22	16.92	1.941E-03	2.473E-03	0.0575	2.341E-03	0.0676	1.657E-03
T 1003(200)	19.30	18.04	1.931E-03	2.398E-03	0.0558	2.270E-03	0.0656	1.607E-03
S 1003(200)	19.30	18.04	1.931E-03	2.398E-03	0.0558	2.270E-03	0.0656	1.607E-03
M 1003(200)	19.30	18.04	1.931E-03	2.398E-03	0.0558	2.270E-03	0.0656	1.607E-03

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NASA-RI ORBITER HEATING  
 AEDC(ARD, INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL R  
 7/10/73

GROUP CONFIG MODEL MACH NO P0(P/SIA) T0(DEG R) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREBEND ROLL-MODEL YAW  
 103 4 ORBITER R1 7.97 424.5 1310 35.04 -5.04 -30.00 -180.00 -0.00  
 T-INF P-INF Q-INF V-INF RHO-INF MU-INF HF/FT HREF ST/REF  
 (DEG R) (P/SIA) (P/SIA) (FT/SEC) (SLUGS/FT<sup>3</sup>) (LB-SEC/FT<sup>2</sup>) (FT-LB) (LB-SEC/FT<sup>2</sup>) (R=0.175E1) (R=0.175E1)  
 95.6 0.85 1.98 3018 3.011E-05 7.695E-08 1.941E 06 3.441E-02 2.917E-02  
 CAMERA ROLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHOXCAK) TRAR(ITO) BETAI(TO)  
 TOP(IT) 8094  
 SIDE(S) 7486  
 MOTION(B) 8194  
 200 80 0519 1.559E-01 1.5784E-01

PIC NO TIME DELTIDE H(TO) HREF M(TO) MREF M(,QT0)/MREF M(,923TO) HREF M(,923TO)/MREF ST(ITO) ST(ITO)  
 S 4690(200) 19.22 18.03 1.929E-03 0.557 2.397E-03 0.562 2.269E-03 0.655 1.606E-03  
 S 1004(200) 20.37 19.08 1.875E-03 0.542 2.330E-03 0.673 2.205E-03 0.637 1.561E-03  
 S 4691(200) 20.37 19.08 1.875E-03 0.542 2.330E-03 0.673 2.205E-03 0.637 1.561E-03  
 R 6934(200) 20.27 19.08 1.875E-03 0.542 2.330E-03 0.673 2.205E-03 0.637 1.561E-03  
 R 6935(200) 21.42 20.13 1.826E-03 0.527 2.268E-03 0.655 2.147E-03 0.620 1.519E-03  
 T 1005(200) 21.45 20.14 1.826E-03 0.527 2.268E-03 0.655 2.147E-03 0.620 1.519E-03  
 S 4692(200) 21.45 20.16 1.826E-03 0.527 2.268E-03 0.655 2.147E-03 0.620 1.519E-03  
 T 1004(200) 22.50 21.21 1.779E-03 0.514 2.210E-03 0.638 2.092E-03 0.604 1.481E-03  
 S 4693(200) 22.50 21.21 1.779E-03 0.514 2.210E-03 0.638 2.092E-03 0.604 1.481E-03  
 M 6936(200) 22.50 21.21 1.779E-03 0.514 2.210E-03 0.638 2.092E-03 0.604 1.481E-03  
 T 1007(200) 24.30 23.01 1.708E-03 0.493 2.121E-03 0.613 2.008E-03 0.580 1.421E-03  
 S 4694(200) 24.30 23.01 1.708E-03 0.493 2.121E-03 0.613 2.008E-03 0.580 1.421E-03  
 M 6937(200) 24.30 23.04 1.708E-03 0.493 2.121E-03 0.613 2.008E-03 0.580 1.421E-03  
 T 1008(200) 26.30 25.04 1.636E-03 0.473 2.033E-03 0.567 1.924E-03 0.556 1.361E-03  
 S 4695(200) 26.30 25.04 1.636E-03 0.473 2.033E-03 0.567 1.924E-03 0.556 1.361E-03  
 M 6938(200) 26.30 25.04 1.636E-03 0.473 2.033E-03 0.567 1.924E-03 0.556 1.361E-03  
 S 4696(200) 28.38 27.09 1.574E-03 0.455 1.955E-03 0.545 1.851E-03 0.535 1.309E-03  
 M 6939(200) 28.38 27.09 1.574E-03 0.455 1.955E-03 0.545 1.851E-03 0.535 1.309E-03  
 T 1009(200) 28.41 27.11 1.574E-03 0.455 1.955E-03 0.545 1.851E-03 0.535 1.309E-03  
 M 6940(200) 30.41 29.12 1.518E-03 0.438 1.885E-03 0.526 1.784E-03 0.516 1.263E-03  
 T 1010(200) 30.44 29.14 1.518E-03 0.438 1.885E-03 0.526 1.784E-03 0.516 1.263E-03  
 S 4697(200) 30.44 29.14 1.518E-03 0.438 1.885E-03 0.526 1.784E-03 0.516 1.263E-03  
 T 1011(200) 32.46 31.17 1.457E-03 0.424 1.823E-03 0.506 1.725E-03 0.498 1.220E-03  
 S 4698(200) 32.46 31.17 1.457E-03 0.424 1.823E-03 0.506 1.725E-03 0.498 1.220E-03  
 4 6941(200) 32.46 31.17 1.457E-03 0.424 1.823E-03 0.506 1.725E-03 0.498 1.220E-03

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7/10/73

NASA-HI ORBITER PEATING AEDC(AND, INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH TYPE-450N TUNNEL R

VA2H9

GROUP CONFIG MODEL MACH NO PO(PSIA) TO(DEG R) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREBEND ROLL-MODEL YAW  
 103 4 ORBITER R1 7.97 424.8 1310 35.04 -5.04 -30.00 -180.00 -0.00

T-INF P-INF Q-INF V-INF MU-INF MU-INF HE/FT MREF SIREF  
 (DEG R) (PSIA) (PSIA) (FT/SEC) (SLUGS/FT<sup>3</sup>) (LBS-SEC/FT<sup>2</sup>) (FT-L) (LBS-SEC/FT<sup>2</sup>) (R= .0175EI)

95.4 .045 1.982 3818 3.913E-05 7.636E-08 1.941E 04 3.443E-02 2.916E-02

CAMERA ROLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RH0ACR) TBAR(ITO) BETA(ITO)

TOP(IT) 8094 200 .0519 1.559E-01 1.5784E-01

5'DETS 7646  
 BOTTOM(M) 8194

PIC NO TIME DELTIME H(ITO) H(ITO)/MREF H(-9TO)/MREF H(-923TO) H(-923TO)/MREF ST(ITO)  
 1 1012(200) 34.59 33.20 1.422E-03 .0411 1.766E-03 .0510 1.672E-03 .0483 1.182E-03  
 5 4499(200) 34.59 33.20 1.422E-03 .0411 1.766E-03 .0510 1.672E-03 .0483 1.182E-03  
 4 6942(200) 34.59 33.20 1.422E-03 .0411 1.766E-03 .0510 1.672E-03 .0483 1.182E-03  
 1 1013(200) 36.52 35.22 1.380E-03 .0399 1.715E-03 .0495 1.623E-03 .0469 1.148E-03  
 5 4700(200) 36.52 35.22 1.380E-03 .0399 1.715E-03 .0495 1.623E-03 .0469 1.148E-03  
 4 6943(200) 36.52 35.22 1.380E-03 .0399 1.715E-03 .0495 1.623E-03 .0469 1.148E-03

MODEL HAS LEFT CENTERLINE



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NASA-R1 ORBITER PEATING

AEDCI(AMC-1) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL R

VA289

HRUP CONF16 MODEL MACM NO V(ISTAT) T(DEG R) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREBEMO ROLL-MODEL YAW  
 104 7 ORBITER RA 7.97 424.7 1313 35.04 -5.04 -30.00 -100.00 -0.00

T-INF P-INF O-INF V-INF RMU-INF MU-INF RF/FT MREF SREF  
 (DEG R) (PSIA) (PSIA) (FT/SEC) (SLUGS/FT3) (LB-SEC/FT2) (FT-1) (R= .0175F1) (R= .0175F1)  
 94.8 .445 1.992 3827 3.005E-05 7.711E-04 1.935E 04 3.443E-02 2.920E-02

CAMERA ROLL NO PAINT IFMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHOXCK) TBAR(10) BETAITO)

TOP(T) 8094  
 SIDE(S) 7686  
 BOTTOM(B) 8194

HTC NO TIME DELTIME H(TO) M(TO)/MREF H(.910) H(.923TO) H(.923TO)/MREF ST(10)

T 1014(150) 1.18 MODEL HAS NOT REACHED CENTERLINE  
 S 4701(150) 1.18 MODEL HAS NOT REACHED CENTERLINE  
 M 4944(150) 1.18 MODEL HAS NOT REACHED CENTERLINE  
 T 1015(150) 2.25 MODEL HAS NOT REACHED CENTERLINE  
 S 4702(150) 2.25 MODEL HAS NOT REACHED CENTERLINE  
 M 4945(150) 2.25 MODEL HAS NOT REACHED CENTERLINE

INJECT TIME = 2.30

T 1014(150) 3.23 DATA NOT YET VALID  
 S 4703(150) 3.23 DATA NOT YET VALID  
 M 4944(150) 3.23 DATA NOT YET VALID

T	1014(150)	4.28	3.09	1.343E-02	1.402E-02	.5200	1.675E-02	.4835	1.124E-02	1.124E-02	F
S	4701(150)	4.28	3.09	1.343E-02	1.402E-02	.5200	1.675E-02	.4835	1.124E-02	1.124E-02	F
M	4944(150)	4.28	3.09	1.343E-02	1.402E-02	.5200	1.675E-02	.4835	1.124E-02	1.124E-02	F
T	1015(150)	5.46	4.14	1.173E-02	1.552E-02	.4476	1.443E-02	.4163	9.675E-03	9.675E-03	
S	4702(150)	5.46	4.14	1.173E-02	1.552E-02	.4476	1.443E-02	.4163	9.675E-03	9.675E-03	
M	4945(150)	5.46	4.14	1.173E-02	1.552E-02	.4476	1.443E-02	.4163	9.675E-03	9.675E-03	
T	1014(150)	6.51	5.21	1.044E-02	1.384E-02	.3909	1.289E-02	.3719	8.643E-03	8.643E-03	
S	4701(150)	6.51	5.21	1.044E-02	1.384E-02	.3909	1.289E-02	.3719	8.643E-03	8.643E-03	
M	4944(150)	6.51	5.21	1.044E-02	1.384E-02	.3909	1.289E-02	.3719	8.643E-03	8.643E-03	
T	1015(150)	7.56	6.27	9.504E-03	1.265E-02	.3448	1.174E-02	.3392	7.883E-03	7.883E-03	
S	4702(150)	7.56	6.27	9.504E-03	1.265E-02	.3448	1.174E-02	.3392	7.883E-03	7.883E-03	
M	4945(150)	7.56	6.27	9.504E-03	1.265E-02	.3448	1.174E-02	.3392	7.883E-03	7.883E-03	
T	1014(150)	8.58	6.29	9.545E-03	1.262E-02	.3441	1.174E-02	.3386	7.869E-03	7.869E-03	
S	4701(150)	8.58	6.29	9.545E-03	1.262E-02	.3441	1.174E-02	.3386	7.869E-03	7.869E-03	
M	4944(150)	8.58	6.29	9.545E-03	1.262E-02	.3441	1.174E-02	.3386	7.869E-03	7.869E-03	
T	1015(150)	9.63	7.34	8.836E-03	1.168E-02	.3371	1.086E-02	.3135	7.286E-03	7.286E-03	
S	4702(150)	9.63	7.34	8.836E-03	1.168E-02	.3371	1.086E-02	.3135	7.286E-03	7.286E-03	
M	4945(150)	9.63	7.34	8.836E-03	1.168E-02	.3371	1.086E-02	.3135	7.286E-03	7.286E-03	
T	1014(150)	9.71	6.42	8.252E-03	1.091E-02	.3147	1.015E-02	.2927	6.801E-03	6.801E-03	
S	4701(150)	9.71	6.42	8.252E-03	1.091E-02	.3147	1.015E-02	.2927	6.801E-03	6.801E-03	
M	4944(150)	9.71	6.42	8.252E-03	1.091E-02	.3147	1.015E-02	.2927	6.801E-03	6.801E-03	

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NASA-R1 ORBITER HEATING  
AEDC(AR, INC.) ARNOLD AFS, TENNESSEE  
VON KARMAN GAS DYNAMICS FACILITY  
50 INCH HYPERSONIC TUNNEL R

7/10/73

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ORBITER HEATING MODEL MACH NO PO(PSIA) TO(DEG R) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREBEND ROLL-MODEL YAW  
104 7 ORBITER #4 7.97 4 .6 1313 35.04 -5.04 -30.00 -180.00 -.00  
T-1NF P-1NF Q-1NF V-1NF MU-1NF RU-1NF RZ-1NF STREF  
(DEG R) (PSIA) (FT/SEC) (SLUGS/FT<sup>3</sup>) (LBS-SEC/FT<sup>2</sup>) (FT-LB) (LBS-0.175E1) (R-0.175E1)  
95.0 .045 1.99E 3R2 3.013E-05 7.711E-08 1.939E 06 3.447E-02 2.917E-02  
CAMERA ROLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHOXCAK) TRAR(TO) BETA(TO)  
104(T) 8094 350 80 .0550 3.496E-01 4.3530E-01  
SICR(S) 7686  
MOTIC(R) 8194

PIC NO	TIME DELTIME	M(TO)	M(TO)/MREF	M(1.9T)	M(1.9T)/MREF	M(1.9T)	M(1.9T)/MREF	ST(TO)
M 4953(1350)	10.76	9.47	7.740E-03	1.029E-02	1.029E-02	9.587E-03	9.587E-03	6.411E-03
T 1423(1350)	10.79	9.49	7.770E-03	.2241	.2241	9.554E-03	9.554E-03	6.404E-03
S 4711(1350)	10.79	9.49	7.770E-03	.2241	.2241	9.554E-03	9.554E-03	6.404E-03
T 1024(1350)	11.84	10.55	7.372E-03	.2126	.2126	9.066E-03	9.066E-03	6.075E-03
S 4711(1350)	11.84	10.55	7.372E-03	.2126	.2126	9.066E-03	9.066E-03	6.075E-03
M 6954(1350)	11.84	10.55	7.372E-03	.2126	.2126	9.066E-03	9.066E-03	6.075E-03
M 4955(1350)	12.89	11.64	7.030E-03	.2024	.2024	8.645E-03	8.645E-03	5.794E-03
T 1025(1350)	12.91	11.62	7.043E-03	.2026	.2026	8.636E-03	8.636E-03	5.790E-03
S 4712(1350)	12.91	11.62	7.043E-03	.2026	.2026	8.636E-03	8.636E-03	5.790E-03
T 1026(1350)	13.57	12.67	6.745E-03	.1940	.1940	8.270E-03	8.270E-03	5.543E-03
M 4956(1350)	13.57	12.67	6.745E-03	.1940	.1940	8.270E-03	8.270E-03	5.543E-03
S 4713(1350)	13.59	12.70	6.719E-03	.1938	.1938	8.262E-03	8.262E-03	5.538E-03
T 1027(1350)	15.04	13.75	6.447E-03	.1862	.1862	7.939E-03	7.939E-03	5.318E-03
S 4714(1350)	15.04	13.75	6.447E-03	.1862	.1862	7.939E-03	7.939E-03	5.318E-03
M 4957(1350)	15.04	13.75	6.447E-03	.1862	.1862	7.939E-03	7.939E-03	5.318E-03
M 4958(1350)	15.09	14.80	6.223E-03	.1794	.1794	7.652E-03	7.652E-03	5.124E-03
T 1028(1350)	16.12	14.87	6.218E-03	.1793	.1793	7.646E-03	7.646E-03	5.123E-03
S 4715(1350)	16.12	14.87	6.218E-03	.1793	.1793	7.646E-03	7.646E-03	5.123E-03
T 1029(1350)	17.17	15.80	6.009E-03	.1732	.1732	7.388E-03	7.388E-03	4.947E-03
S 4716(1350)	17.17	15.80	6.009E-03	.1732	.1732	7.388E-03	7.388E-03	4.947E-03
M 4959(1350)	17.22	16.00	5.819E-03	.1678	.1678	7.155E-03	7.155E-03	4.792E-03
T 1030(1350)	18.22	16.95	5.815E-03	.1674	.1674	7.150E-03	7.150E-03	4.788E-03
S 4717(1350)	18.25	16.95	5.815E-03	.1676	.1676	7.150E-03	7.150E-03	4.788E-03
M 4960(1350)	18.25	16.95	5.815E-03	.1676	.1676	7.150E-03	7.150E-03	4.788E-03
T 1031(1350)	19.20	18.00	5.642E-03	.1627	.1627	6.938E-03	6.938E-03	4.646E-03
M 4961(1350)	19.20	18.00	5.642E-03	.1627	.1627	6.938E-03	6.938E-03	4.646E-03

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Comp 105  
7739  
E model

4531  
 $\alpha = 35^\circ$   
 $\phi = 0^\circ$

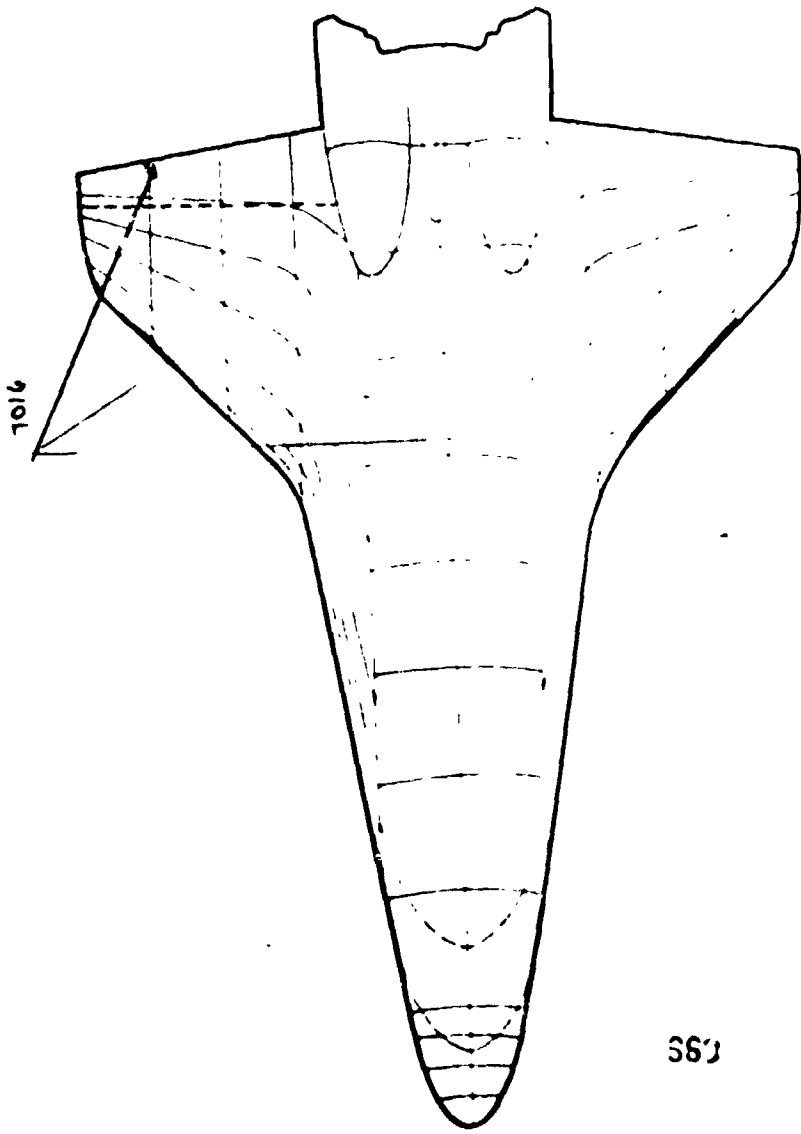


Figure 129

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MASA-MI ARBITER PEATING  
 VA200  
 AEDC(IAR-INC) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL R

GROUP	CONFIG	MODEL	MACH NO	PO(PSIA)	TO(CEG R)	ALPHA-MODEL	ALPHA-SECTION	ALPHA-PREBEND	ROLL-MODEL	YAW
105	3	CREITER E	7.97	426.8	1314	35.04	-5.04	-30.00	-180.00	--.00
1-Inf	P-Inf	Q-Inf	V-Inf	RHO-Inf	MU-Inf	DE/FT	MREF	STREF		
(DEG R)	(PSIA)	(FT/SEC)	(SLUGS/FT <sup>3</sup> )	(LB-SEC/FT <sup>2</sup> )	(FT-LB)	(IN-0.175FT)	(IN-0.175FT)			
95.9	0.465	1.992	3824	3.970E-05	7.719E-08	1.942E 06	3.472E-02	2.915E-02		

CAMERA	ROLL NO	PAINT TEMP (DEG F)	INITIAL TEMP (DEG F)	SQUARE ROOT (RMORCAK)	THAR(ITO)	BETA(ITO)
FOOTIT	8094					
SICED	7272	400	79	.0555	0	0
MOICHIRI	7139					

PIC NO	TIME RELTIME	MITO)	MITO)/MREF	MI(.9TO)	MI(.9TO)/MREF	MI(.923TO)	MI(.923TO)/MREF	ST(ITO)
M 4994(400)	1.15	MODEL HAS NOT REACHED CENTERLINE						
T 1394(400)	1.18	MODEL HAS NOT REACHED CENTERLINE						
S 4773(400)	1.18	MODEL HAS NOT REACHED CENTERLINE						
T 1040(400)	2.23	MODEL HAS NOT REACHED CENTERLINE						
S 4774(400)	2.23	MODEL HAS NOT REACHED CENTERLINE						
M 4995(400)	2.23	MODEL HAS NOT REACHED CENTERLINE						
INJECT TIME	2.30							

DATA NOT YET VALID  
 DATA NOT YET VALID  
 DATA NOT YET VALID

M 4994(400)	3.20	1.779E-02	.5124	2.430E-02	.6997	2.238E-02	.6445	1.459E-02
T 1042(400)	3.20	1.779E-02	.5124	2.430E-02	.6997	2.238E-02	.6445	1.459E-02
M 4995(400)	3.20	1.772E-02	.5103	2.420E-02	.6968	2.229E-02	.6419	1.453E-02
T 1043(400)	3.20	1.531E-02	.4408	2.090E-02	.6019	1.925E-02	.5544	1.255E-02
S 4775(400)	3.20	1.531E-02	.4408	2.090E-02	.6019	1.925E-02	.5544	1.255E-02
M 4996(400)	3.20	1.531E-02	.4408	2.090E-02	.6019	1.925E-02	.5544	1.255E-02
T 1044(400)	3.20	1.367E-02	.3936	1.866E-02	.5374	1.719E-02	.4950	1.120E-02
S 4776(400)	3.20	1.367E-02	.3936	1.866E-02	.5374	1.719E-02	.4950	1.120E-02
T 1045(400)	3.20	1.367E-02	.3936	1.866E-02	.5374	1.719E-02	.4950	1.120E-02
M 4997(400)	3.20	1.244E-02	.3582	1.696E-02	.4891	1.565E-02	.4505	1.020E-02
T 1046(400)	3.20	1.244E-02	.3582	1.696E-02	.4891	1.565E-02	.4505	1.020E-02
S 4777(400)	3.20	1.244E-02	.3582	1.696E-02	.4891	1.565E-02	.4505	1.020E-02
T 1047(400)	3.20	1.244E-02	.3582	1.696E-02	.4891	1.565E-02	.4505	1.020E-02
M 4998(400)	3.20	1.149E-02	.3310	1.569E-02	.4520	1.445E-02	.4164	9.428E-03
T 1048(400)	3.20	1.149E-02	.3310	1.569E-02	.4520	1.445E-02	.4164	9.428E-03
S 4778(400)	3.20	1.149E-02	.3310	1.569E-02	.4520	1.445E-02	.4164	9.428E-03
T 1049(400)	3.20	1.075E-02	.2995	1.468E-02	.4226	1.352E-02	.3892	8.809E-03

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NASA-RI ORBITER HEATING AEDC(ARO, INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL R

VA289

GROUP CONFIG MODEL MACH NO PD(PISA) TO( DEG P) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREBEND ROLL-MODEL YAW  
 105 3 ORBITER E 7.97 427.0 1314 15.04 -5.04 -30.00 -180.00 --.00  
 T-IAF P-IAF Q-IAF W-IAF MU-IAF RU-IAF RE/FT SREF  
 (0.5 R) (PISA) (PISA) (FT/SEC) (SLUGS/FT<sup>3</sup>) (LB-SEC/FT<sup>2</sup>) (FT-L) (R=.0175FI) (R=.0175FI)  
 95.9 .045 1.993 3823 3.923E-05 7.717E-08 1.944E 05 3.473E-02 2.914E-02

CAMERA ROLL NO PAINT IFMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHO/CAK) TBAR(TO) BETA(TO)  
 TOP(T) 8094  
 SIDE(S) 7272  
 MOUTH(M) 7739  
 400 79 .0555 4.143E-01 5.6108E-01

PIC NO	TIME	DELTIME	H(TO)	M(TO)/HREF	M(.9TO)	M(.9TO)/HREF	M(.923TO)	M(.923TO)/HREF	ST(TO)
1	1047(400)	9.71	8.42	1.073E-02	1.465E-02	.3091	1.350E-02	.3887	8.798E-03
5	4741(400)	9.71	8.42	1.073E-02	1.465E-02	.3091	1.350E-02	.3887	8.798E-03
1	1049(400)	10.76	9.47	1.012E-02	1.382E-02	.2914	1.273E-02	.3655	8.296E-03
5	4752(400)	10.76	9.47	1.012E-02	1.382E-02	.2914	1.273E-02	.3655	8.296E-03
4	7003(400)	10.76	9.47	1.012E-02	1.382E-02	.2914	1.273E-02	.3655	8.296E-03
4	7003(400)	11.81	10.52	9.600E-03	1.311E-02	.2765	1.207E-02	.3477	7.870E-03
1	1047(400)	11.84	10.55	9.549E-03	1.309E-02	.2752	1.206E-02	.3473	7.862E-03
5	4783(400)	11.84	10.55	9.549E-03	1.309E-02	.2752	1.206E-02	.3473	7.862E-03
1	1050(400)	12.89	11.60	9.144E-03	1.249E-02	.2433	1.150E-02	.3312	7.498E-03
4	7005(400)	12.89	11.60	9.144E-03	1.249E-02	.2433	1.150E-02	.3312	7.498E-03
5	4784(400)	12.91	11.62	9.144E-03	1.249E-02	.2433	1.150E-02	.3312	7.498E-03
1	1051(400)	13.57	12.47	8.747E-03	1.194E-02	.2599	1.100E-02	.3169	7.174E-03
5	4785(400)	13.57	12.47	8.747E-03	1.194E-02	.2599	1.100E-02	.3169	7.174E-03
4	7006(400)	13.57	12.47	8.747E-03	1.194E-02	.2599	1.100E-02	.3169	7.174E-03
1	1052(400)	15.02	13.72	8.346E-03	1.147E-02	.2421	1.054E-02	.3042	6.888E-03
5	4786(400)	15.04	13.75	8.346E-03	1.147E-02	.2419	1.054E-02	.3042	6.888E-03
1	1053(400)	16.09	14.80	8.044E-03	1.105E-02	.2331	1.019E-02	.2932	6.637E-03
5	4787(400)	16.09	14.80	8.044E-03	1.105E-02	.2331	1.019E-02	.2932	6.637E-03
4	7007(400)	16.09	14.80	8.044E-03	1.105E-02	.2331	1.019E-02	.2932	6.637E-03
1	1054(400)	17.17	15.88	7.815E-03	1.047E-02	.2251	9.829E-03	.2831	6.410E-03
5	4788(400)	17.17	15.88	7.815E-03	1.047E-02	.2251	9.829E-03	.2831	6.410E-03
4	7009(400)	17.17	15.88	7.815E-03	1.047E-02	.2251	9.829E-03	.2831	6.410E-03
1	1055(400)	18.22	16.93	7.548E-03	1.033E-02	.2179	9.519E-03	.2741	6.205E-03
5	4789(400)	18.22	16.93	7.548E-03	1.033E-02	.2179	9.519E-03	.2741	6.205E-03
4	7010(400)	18.22	16.93	7.548E-03	1.033E-02	.2179	9.519E-03	.2741	6.205E-03

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NASA-R1 ORBITER HEATING AEDC(ARO, INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL B

VA2R9

GROUP CONFIG MODEL MACH NO PO(PISA) TO( DEG R) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREBEND ROLL-MODEL YAW  
 105 3 ORBITER E 7.97 426.9 1314 35.04 -5.04 -30.00 -180.00 -0.00

T-INF P-INF Q-INF V-INF MU-INF MU-INF RE/FT MREF STREF  
 (DEG R) (PSIA) (ET/SEC) (SLUGS/ET) (LB-SEC/ET) (ET-1) (LB-0.175EI) (LB-0.175EI)  
 95.9 .045 1.992 3824 3.971E-05 7.718E-08 1.943E 06 3.473E-02 2.914E-02

CAMERA ROLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHOXCK) TBAR(TO) BFTA(TO)  
 TOP(T) 8094  
 SIDE(S) 7272 79 .0555 4.143E-01 5.6108E-01  
 MOTION(M) 7739

PTC NO	TIME DELTIME	M(TO)	M(TO)/MREF	M(.9TO)	M(.9TO)/MREF	M(.92TO)	M(.92TO)/MREF	ST(TO)
S 4789(400)	18.25	7.563E-03	.2178	1.033E-02	.2974	9.512E-03	.2739	6.202E-03
T 1056(400)	19.30	7.339E-03	.2114	1.002E-02	.2886	9.230E-03	.2658	6.018E-03
S 4790(400)	19.30	7.339E-03	.2114	1.002E-02	.2886	9.230E-03	.2658	6.018E-03
M 7011(400)	19.30	7.339E-03	.2114	1.002E-02	.2886	9.230E-03	.2658	6.018E-03
M 7012(400)	20.25	7.133E-03	.2054	9.740E-03	.2805	8.972E-03	.2584	5.848E-03
T 1057(400)	20.27	7.129E-03	.2054	9.734E-03	.2804	8.966E-03	.2583	5.848E-03
S 4791(400)	20.27	7.129E-03	.2054	9.734E-03	.2804	8.966E-03	.2583	5.848E-03
S 4792(400)	21.42	6.940E-03	.1999	9.476E-03	.2729	8.729E-03	.2514	5.692E-03
M 7013(400)	21.42	6.940E-03	.1999	9.476E-03	.2729	8.729E-03	.2514	5.692E-03
T 1058(400)	21.45	6.936E-03	.1997	9.470E-03	.2727	8.723E-03	.2512	5.688E-03
T 1059(400)	22.50	6.762E-03	.1948	9.233E-03	.2660	8.504E-03	.2450	5.547E-03
S 4793(400)	22.50	6.762E-03	.1948	9.233E-03	.2660	8.504E-03	.2450	5.547E-03
M 7014(400)	22.50	6.762E-03	.1948	9.233E-03	.2660	8.504E-03	.2450	5.547E-03
T 1060(400)	23.55	6.600E-03	.1901	9.012E-03	.2596	8.301E-03	.2391	5.413E-03
M 7015(400)	23.55	6.600E-03	.1901	9.012E-03	.2596	8.301E-03	.2391	5.413E-03
S 4794(400)	23.55	6.547E-03	.1900	9.007E-03	.2595	8.297E-03	.2390	5.412E-03
T 1061(400)	24.63	6.446E-03	.1856	8.802E-03	.2535	8.107E-03	.2335	5.286E-03
S 4795(400)	24.63	6.446E-03	.1856	8.802E-03	.2535	8.107E-03	.2335	5.286E-03
M 7016(400)	24.63	6.446E-03	.1856	8.802E-03	.2535	8.107E-03	.2335	5.286E-03
T 1062(400)	26.61	6.149E-03	.1783	8.451E-03	.2434	7.784E-03	.2242	5.076E-03
S 4796(400)	26.61	6.149E-03	.1783	8.451E-03	.2434	7.784E-03	.2242	5.076E-03
M 7017(400)	26.61	6.149E-03	.1783	8.451E-03	.2434	7.784E-03	.2242	5.076E-03
MODEL HAS LEFT CENTERLINE								
T 1063(400)	28.63	5.955E-03	.1715	8.132E-03	.2342	7.490E-03	.2157	4.883E-03
S 4797(400)	28.63	5.955E-03	.1715	8.132E-03	.2342	7.490E-03	.2157	4.883E-03
M 7018(400)	28.63	5.955E-03	.1715	8.132E-03	.2342	7.490E-03	.2157	4.883E-03

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NASA-RI ORBITER HEATING  
 VA299  
 MEDC(ARO,INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL 4

GROUP CONFID MODEL MACH NO PO(PSIA) TO(DEG R) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREBEND ROLL-MODEL YAW  
 106 6 ORBITER R3 7.97 425.3 1313 35.04 -5.04 -30.00 -100.0 -0.00

T-1AF P-1MF Q-1MF V-1MF RHO-1MF MU-1MF RE/FT HREF SREF  
 (DEG R) (PSIA) (FT/SEC) (SLUGS/FT<sup>3</sup>) (LB-SEC/FT<sup>2</sup>) (FI-1) (R= .0175FI) (R= .0175FI)  
 95.6 .045 1.985 3821 3.908E-05 7.716E-08 1.936E-06 3.466E-02 2.919E-02

CAMERA ROLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHOXCR) TRAR(TO) BETAITO)  
 TOP(IT) 8094  
 SIDE(S) 7272 300 .0544  
 BOTTOM(B) 7339

PIC NO TIME DELTIME H(TO) HREF H(1.9TO) H(1.10)/HREF H(.923TO) H(.923TO)/HREF ST(1TO)

M 7019(100) 1.15 MODEL HAS NOT REACHED CENTERLINE  
 T 1064(100) 1.18 MODEL HAS NOT REACHED CENTERLINE  
 S 4798(100) 1.18 MODEL HAS NOT REACHED CENTERLINE  
 F 1065(100) 2.23 MODEL HAS NOT REACHED CENTERLINE  
 R 7020(100) 2.23 MODEL HAS NOT REACHED CENTERLINE  
 S 4799(100) 2.25 MODEL HAS NOT REACHED CENTERLINE

INJECT TIME = 2.29  
 T 1066(100) 3.30 DATA NOT YET VALID  
 S 4800(100) 3.30 DATA NOT YET VALID

M 7021(100) 3.30 DATA NOT YET VALID  
 M 7021(100) 3.30 DATA NOT YET VALID  
 T 1067(100) 4.36 3.05 .2925 1.307E-02 .3770 1.225E-02 .3532 0.381E-03  
 S 4801(100) 4.38 3.14 1.010E-02 .2914 1.302E-02 .3755 1.220E-02 .3518 8.351E-03  
 F 1068(100) 4.38 3.14 1.010E-02 .2914 1.302E-02 .3755 1.220E-02 .3518 8.351E-03  
 T 1068(100) 5.43 4.15 1.010E-02 .2914 1.302E-02 .3755 1.220E-02 .3518 8.351E-03  
 S 4802(100) 5.43 4.15 1.010E-02 .2914 1.302E-02 .3755 1.220E-02 .3518 8.351E-03  
 M 7023(100) 5.43 4.15 1.010E-02 .2914 1.302E-02 .3755 1.220E-02 .3518 8.351E-03  
 T 1069(100) 6.51 5.23 1.010E-02 .2914 1.302E-02 .3755 1.220E-02 .3518 8.351E-03  
 S 4803(100) 6.51 5.23 1.010E-02 .2914 1.302E-02 .3755 1.220E-02 .3518 8.351E-03  
 M 7024(100) 6.51 5.23 1.010E-02 .2914 1.302E-02 .3755 1.220E-02 .3518 8.351E-03  
 T 1070(100) 7.56 6.28 1.010E-02 .2914 1.302E-02 .3755 1.220E-02 .3518 8.351E-03  
 M 7025(100) 7.56 6.28 1.010E-02 .2914 1.302E-02 .3755 1.220E-02 .3518 8.351E-03  
 S 4804(100) 7.56 6.28 1.010E-02 .2914 1.302E-02 .3755 1.220E-02 .3518 8.351E-03  
 T 1071(100) 8.63 7.36 1.010E-02 .2914 1.302E-02 .3755 1.220E-02 .3518 8.351E-03  
 S 4805(100) 8.63 7.36 1.010E-02 .2914 1.302E-02 .3755 1.220E-02 .3518 8.351E-03  
 M 7026(100) 8.63 7.36 1.010E-02 .2914 1.302E-02 .3755 1.220E-02 .3518 8.351E-03  
 T 1072(100) 9.69 8.41 1.010E-02 .2914 1.302E-02 .3755 1.220E-02 .3518 8.351E-03

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7/10/73

## NASA-RI ORBITER HEATING

AEDC(ARO, INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL R

VA2R9

GROUP	CONFIG	MODEL	MACH NO	PR(PSTA)	TO( DEG F)	ALPHA-MODEL	ALPHA-SECTOR	ALPHA-PREBEND	ROLL-MODEL	YAW
106	6	ORBITER R3	7.97	426.0	1313	35.04	-5.04	-30.00	-180.00	--00
T-JAF	P-INF	Q-INF	W-INF	RHO-INF	MU-INF	RE/FT	MREF	SREF		
(DEG R)	(PSTA)	(PSTA)	(FT/SEC)	(SLUGS/FT <sup>3</sup> )	(LB-SEC/FT <sup>2</sup> )	(FT-L)	(R <sup>2</sup> -.0175ET)	(R <sup>2</sup> -.0175ET)		
95.8	.045	1.982	3823	3.914E-05	7.716E-08	1.940E 06	3.449E-02	2.917E-02		
CAMERA	ROLL NO	PAINT IFMP (DEG F)	INITIAL TEMP (DEG F)	SQUARE ROOT (RHOXCK)	TRAR(TO)	BETA(TO)				
TOP(T)	8094									
SIDE(S)	7272	300	81	.0544	2.836E-01	3.2704E-01				
MOT(MIR)	7739									

421

PTC NO	TIME DELTIME	M(TO)	M(TO)/MREF	M(.9TO)	MREF	M(.9TO)/MREF	M(.923TO)	MREF	M(.923TO)/MREF	ST(TO)
T 1072(300)	9.71	8.43	6.127E-03	.1767	7.894E-03	.2277	7.398E-03	.2133	5.062E-03	5.062E-03
S 4006(300)	9.71	8.43	6.127E-03	.1767	7.894E-03	.2277	7.398E-03	.2133	5.062E-03	5.062E-03
T 1073(300)	10.76	9.48	5.777E-03	.1666	7.446E-03	.2147	6.976E-03	.2012	4.773E-03	4.773E-03
S 4007(300)	10.76	9.48	5.777E-03	.1666	7.446E-03	.2147	6.976E-03	.2012	4.773E-03	4.773E-03
T 1074(300)	11.84	10.54	5.475E-03	.1578	7.056E-03	.2034	6.611E-03	.1906	4.521E-03	4.521E-03
S 4008(300)	11.84	10.54	5.475E-03	.1578	7.056E-03	.2034	6.611E-03	.1906	4.521E-03	4.521E-03
T 1075(300)	12.89	11.61	5.221E-03	.1505	6.729E-03	.1940	6.305E-03	.1817	4.311E-03	4.311E-03
S 4009(300)	12.89	11.61	5.221E-03	.1504	6.729E-03	.1938	6.298E-03	.1816	4.307E-03	4.307E-03
T 1076(300)	13.57	12.69	4.945E-03	.1440	6.438E-03	.1856	6.031E-03	.1738	4.124E-03	4.124E-03
S 4010(300)	13.57	12.69	4.945E-03	.1440	6.438E-03	.1856	6.031E-03	.1738	4.124E-03	4.124E-03
T 1077(300)	15.02	13.74	4.800E-03	.1383	6.186E-03	.1783	5.791E-03	.1670	3.960E-03	3.960E-03
S 4011(300)	15.04	13.74	4.796E-03	.1382	6.181E-03	.1782	5.791E-03	.1669	3.960E-03	3.960E-03
T 1078(300)	16.09	14.81	4.622E-03	.1332	5.957E-03	.1717	5.581E-03	.1609	3.816E-03	3.816E-03
S 4012(300)	16.09	14.81	4.622E-03	.1332	5.957E-03	.1717	5.581E-03	.1609	3.816E-03	3.816E-03
T 1079(300)	17.17	15.89	4.463E-03	.1286	5.752E-03	.1658	5.389E-03	.1553	3.684E-03	3.684E-03
S 4013(300)	17.17	15.89	4.463E-03	.1286	5.752E-03	.1658	5.389E-03	.1553	3.684E-03	3.684E-03
T 1080(300)	18.25	16.94	4.319E-03	.1245	5.567E-03	.1604	5.215E-03	.1503	3.565E-03	3.565E-03
S 4014(300)	18.25	16.94	4.319E-03	.1245	5.567E-03	.1604	5.215E-03	.1503	3.565E-03	3.565E-03

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VAZAG

AEON (ARO, INC.) ARNOLD AFS, TENNESSEE  
VON KARMAN GAS DYNAMICS FACILITY  
50 INCH HYPERSONIC TUNNEL

7/10/73

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GROUP	CONFID	MODEL	MACH NO	POISIA)	TO(DEG R)	ALPHA-MODEL	ALPHA-SECTOR	ALPHA-PREBEND	ROLL-MODEL	YAW
106	6	ORBITER #3	7.97	426.2	1313	35.04	-5.04	-30.00	-180.00	-0.00
T-1AF	P-1NF	O-1NF	M-1NF	Q-1NF	R-1NF	S-1NF	T-1NF	U-1NF	V-1NF	W-1NF

95.0	0.045	1.999	3023	(L9-SEC/E12)	(F1-1)	(R2-.0175F1)
				3.916E-05	7.715E-08	1.941E 06
						3.470E-02
						2.916E-02

20-30640-02 20-3916-02

TOP(T)	INITIAL TEMP (DEG F)	SQUARE ROOT (RHOXCXK)	TBAR(TO)	BETA(TO)
8094				

300	81	0544	2,836F-01	1-270AF-A1
7272				
7739				
NOTION (8)				

PIC NO	TIME	DELTIME	M(10)	M(10)/HREF	M(.910)	M(.910)/HREF	M(.923T0)	M(.923T0)/HREF	ST(1T0)
T 1081(300)	19.20	19.82	4.191E-03	.1208	5.402E-03	.1557	5.061E-03	.1559	3.460E-03
S 4815(300)	19.20	19.82	4.191E-03	.1208	5.402E-03	.1557	5.061E-03	.1559	3.460E-03
M 7036(300)	19.20	19.82	4.191E-03	.1208	5.402E-03	.1557	5.061E-03	.1559	3.460E-03
T 1092(300)	20.25	19.87	4.074E-03	.1174	5.251E-03	.1513	4.925E-03	.1458	3.460E-03
S 4816(300)	20.25	19.87	4.074E-03	.1174	5.251E-03	.1513	4.925E-03	.1458	3.460E-03
M 7037(300)	20.27	19.87	4.071E-03	.1173	5.248E-03	.1512	4.916E-03	.1417	3.362E-03
T 1083(300)	21.42	20.16	3.964E-03	.1142	5.109E-03	.1472	4.786E-03	.1379	3.360E-03
S 4817(300)	21.42	20.16	3.964E-03	.1142	5.109E-03	.1472	4.786E-03	.1379	3.360E-03
M 7038(300)	21.45	20.17	3.941E-03	.1141	5.106E-03	.1471	4.783E-03	.1378	3.270E-03
T 1084(300)	23.18	21.90	3.802E-03	.1096	4.900E-03	.1412	4.591E-03	.1323	3.268E-03
S 4818(300)	23.18	21.90	3.802E-03	.1096	4.900E-03	.1412	4.591E-03	.1323	3.268E-03
M 7039(300)	23.18	21.90	3.802E-03	.1096	4.900E-03	.1412	4.591E-03	.1323	3.137E-03
T 1085(300)	25.20	23.93	3.637E-03	.1048	4.698E-03	.1351	4.392E-03	.1265	3.137E-03
S 4819(300)	25.20	23.93	3.637E-03	.1048	4.698E-03	.1351	4.392E-03	.1265	3.137E-03
M 7040(300)	25.20	23.93	3.637E-03	.1048	4.698E-03	.1351	4.392E-03	.1265	3.000E-03
T 1086(300)	27.23	25.95	3.542E-03	.1006	4.501E-03	.1297	4.217E-03	.1215	3.000E-03
S 4820(300)	27.23	25.95	3.542E-03	.1006	4.501E-03	.1297	4.217E-03	.1215	3.000E-03
M 7041(300)	27.23	25.95	3.542E-03	.1006	4.501E-03	.1297	4.217E-03	.1215	2.880E-03
MODEL HAS LEFT CENTERLINE									
T 1087(300)	27.63	27.98	3.363E-03	.0969	4.335E-03	.1249	4.061E-03	.1170	2.773E-03
S 4821(300)	27.63	27.98	3.363E-03	.0969	4.335E-03	.1249	4.061E-03	.1170	2.773E-03
M 7042(300)	27.63	27.98	3.363E-03	.0969	4.335E-03	.1249	4.061E-03	.1170	2.773E-03

667



Group 107  
8094  
no

8598  
 $\alpha = 35^\circ$   
 $\phi = 0^\circ$

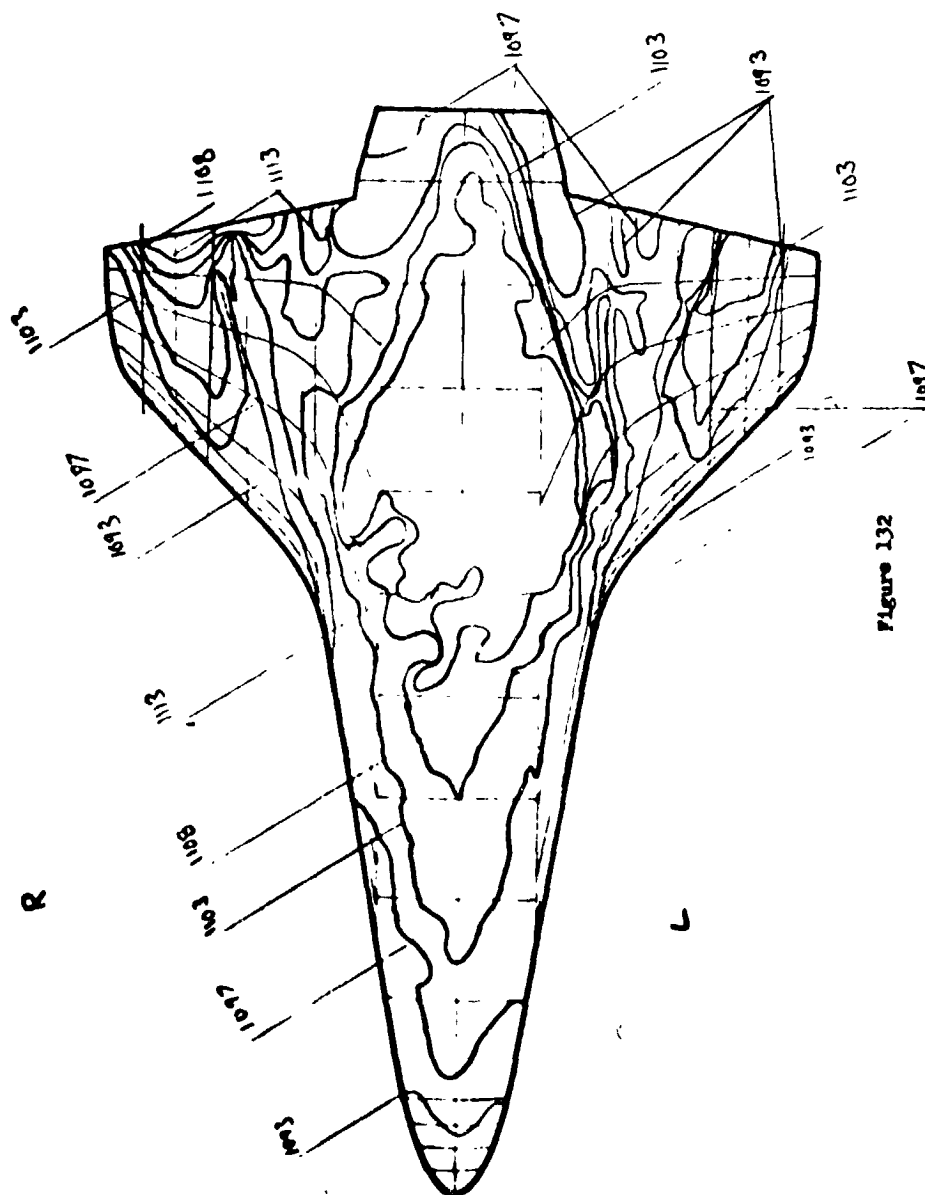


Figure 132

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NASA-BI ORBITER PEATING

AEDC(ARO,INC.) ARNOLD AFS, TENNESSEE  
VON KARMAN GAS DYNAMICS FACILITY  
50 INCH HYPERSONIC TUNNEL R

VA269

GROUP CONFIG MODEL MACH NO PO(PSTA) TO(IDE R) ALPHA-MODEL ALPHA-SECTION ALPHA-PREBEND ROLL-MODEL YAW  
167 2 ORBITER S 7.97 425.1 1312 35.03 -5.03 -30.00 -180.00 -0.00  
T-INF P-INF Q-INF V-INF RHO-INF MU-INF RF/FT HREF STREF  
IDFG M (PSIA) (PSIA) (FT/SEC) (SLUGS/FT3) (LBS-SEC/FT2) (CT-1) (R= .0175FT) (R= .0175FT)  
95.8 .045 1.904 3821 3.909E-05 7.709E-08 1.938E 06 3.465E-02 2.918E-02  
CAPTRA ROLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHOCXK) TBAR(ITO) BETAITO  
TOP(IT) 8094  
SIDFIS) 7272  
HOTTCM(M) 7739

PIC NO TIME DELTME HITOI HITOI/HREF M(.9TO) M(.923TO) M(.923TO)/HREF ST(ITO)

T 1088(250) 1.16 MODEL HAS NOT REACHED CENTERLINE  
S 4822(250) 1.18 MODEL HAS NOT REACHED CENTERLINE  
M 7043(250) 1.18 MODEL HAS NOT REACHED CENTERLINE  
T 1089(250) 2.25 MODEL HAS NOT REACHED CENTERLINE  
S 4823(250) 2.25 MODEL HAS NOT REACHED CENTERLINE  
M 7044(250) 2.25 MODEL HAS NOT REACHED CENTERLINE  
INJECT TIME = 2.30

M 7045(250) 3.30 DATA NOT YET VALID

T 1090(250) 3.33 DATA NOT YET VALID

S 4824(250) 3.33 DATA NOT YET VALID

T 1091(250) 4.38 3.09 7.228E-03 .2086 9.127E-03 .2634 8.601E-03 .2482 5.992E-03

M 7046(250) 4.38 3.09 7.228E-03 .2086 9.127E-03 .2634 8.601E-03 .2482 5.992E-03

S 4825(250) 4.41 3.11 7.149E-03 .2077 9.090E-03 .2623 8.566E-03 .2472 5.968E-03

T 1092(250) 4.41 3.11 7.149E-03 .2077 9.090E-03 .2623 8.566E-03 .2472 5.968E-03

S 4826(250) 5.46 4.14 6.224E-03 .1794 7.859E-03 .2267 7.406E-03 .2137 5.158E-03

M 7047(250) 5.46 4.14 6.224E-03 .1794 7.859E-03 .2267 7.406E-03 .2137 5.158E-03

T 1093(250) 6.51 5.21 5.561E-03 .1605 7.023E-03 .2026 6.618E-03 .1910 4.611E-03

S 4827(250) 6.53 5.24 5.548E-03 .1600 7.006E-03 .2021 6.602E-03 .1904 4.596E-03

M 7048(250) 6.53 5.24 5.548E-03 .1600 7.006E-03 .2021 6.602E-03 .1904 4.596E-03

T 1094(250) 7.58 6.29 5.063E-03 .1461 6.394E-03 .1845 6.025E-03 .1738 4.197E-03

S 4828(250) 7.58 6.29 5.063E-03 .1461 6.394E-03 .1845 6.025E-03 .1738 4.197E-03

M 7049(250) 8.66 7.37 4.679E-03 .1350 5.908E-03 .1704 5.568E-03 .1606 3.875E-03

T 1095(250) 8.66 7.37 4.679E-03 .1350 5.908E-03 .1704 5.568E-03 .1606 3.875E-03

S 4829(250) 9.71 8.42 4.377E-03 .1262 5.527E-03 .1594 5.208E-03 .1502 3.626E-03

M 7051(250) 9.71 8.42 4.377E-03 .1262 5.527E-03 .1594 5.208E-03 .1502 3.626E-03

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AEDC(ARINC) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL R

NASA-RI ORBITER HEATING

VA249

GROUP CONFIG MODEL MACH NO PO(PSIA) TO(DEG R) ALPHA-MODEL ALPHA-SECTION ALPHA-PREBEND ROLL-MODEL YAW  
 107 2 ORBITER S 7.97 425.7 1312 35.03 -5.03 -30.00 -100.00 -0.00

T-INF P-INF Q-INF M-INF RMO-INF MU-INF RE/FT MREF SREF  
 (DEG R) (PSIA) (PSIA) (PSIA) (FT/SEC) (SLUGS/FT<sup>2</sup>) (FT-1) (R=-.0175FT) (R=-.0175FT)  
 95.7 .045 1.987 3821 3.015E-05 7.708E-08 1.941E 06 3.467E-02 2.916E-02

CAMFRA ROLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHOKCK) TBAR(TO) BETA(TO)  
 TOP(T) 8094  
 SIDE(S) 7272 250 80 .0535 2.202E-01 2.3738E-01  
 BOTTOM(B) 7734

PIC NO	TIME DELTIVE	W(TO)	M(TO)/MREF	M(.9TO)	M(.9TO)/MREF	M(.923TO)	M(.923TO)/MREF	ST(TO)
1 1090(250)	9.74 8.44	4.371E-03	.1201	5.519E-03	.1592	5.201E-03	.1500	3.620E-03
2 4301(250)	9.74 8.44	4.371E-03	.1201	5.519E-03	.1592	5.201E-03	.1500	3.620E-03
3 1091(250)	10.79 9.49	4.122E-03	.1189	5.204E-03	.1501	4.904E-03	.1415	3.414E-03
4 4311(250)	10.79 9.49	4.122E-03	.1189	5.204E-03	.1501	4.904E-03	.1415	3.414E-03
5 7052(250)	10.79 9.49	4.122E-03	.1189	5.204E-03	.1501	4.904E-03	.1415	3.414E-03
6 4331(250)	11.24 10.55	7.911E-03	.1128	4.938E-03	.1424	4.654E-03	.1342	3.239E-03
7 1094(250)	11.24 10.57	7.908E-03	.1127	4.932E-03	.1423	4.648E-03	.1341	3.235E-03
8 7053(250)	11.24 10.57	7.908E-03	.1127	4.932E-03	.1423	4.648E-03	.1341	3.235E-03
9 1099(250)	12.51 11.62	7.725E-03	.1074	4.704E-03	.1357	4.433E-03	.1278	3.085E-03
10 7054(250)	12.51 11.62	7.725E-03	.1074	4.704E-03	.1357	4.433E-03	.1278	3.085E-03
11 4331(250)	12.54 11.65	7.721E-03	.1073	4.699E-03	.1355	4.428E-03	.1277	3.082E-03
12 1100(250)	13.59 12.74	7.564E-03	.1028	4.590E-03	.1298	4.241E-03	.1223	2.952E-03
13 4341(250)	13.59 12.74	7.564E-03	.1028	4.590E-03	.1298	4.241E-03	.1223	2.952E-03
14 7055(250)	13.59 12.74	7.564E-03	.1028	4.590E-03	.1298	4.241E-03	.1223	2.952E-03
15 4351(250)	15.04 13.75	7.425E-03	.0987	4.325E-03	.1247	4.075E-03	.1175	2.835E-03
16 1101(250)	15.07 13.77	7.422E-03	.0987	4.321E-03	.1246	4.072E-03	.1174	2.834E-03
17 4351(250)	15.07 13.77	7.422E-03	.0987	4.321E-03	.1246	4.072E-03	.1174	2.834E-03
18 1102(250)	16.12 14.83	7.244E-03	.0951	4.165E-03	.1201	3.925E-03	.1132	2.731E-03
19 7057(250)	16.12 14.83	7.244E-03	.0951	4.165E-03	.1201	3.925E-03	.1132	2.731E-03
20 4361(250)	16.14 14.86	7.245E-03	.0950	4.161E-03	.1200	3.921E-03	.1131	2.729E-03
21 1103(250)	17.19 15.04	7.145E-03	.0918	4.021E-03	.1159	3.790E-03	.1093	2.636E-03
22 4371(250)	17.19 15.04	7.145E-03	.0918	4.021E-03	.1159	3.790E-03	.1093	2.636E-03
23 7058(250)	17.19 15.04	7.145E-03	.0918	4.021E-03	.1159	3.790E-03	.1093	2.636E-03
24 1104(250)	18.25 16.05	7.044E-03	.0899	3.895E-03	.1123	3.670E-03	.1058	2.552E-03
25 4381(250)	18.27 16.08	7.042E-03	.0899	3.892E-03	.1122	3.664E-03	.1057	2.551E-03
26 7059(250)	18.27 16.08	7.042E-03	.0899	3.892E-03	.1122	3.664E-03	.1057	2.551E-03

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NASA-R1 ORBITER HEATING

AEDC(ARD, INC.) ARNOLD AFS, TENNESSEE  
VON KARMAN GAS DYNAMICS FACILITY  
50 INCH HYPERSONIC TUNNEL R

VA249

GROUP CONFIG MODEL MACH NO PO(PSLA) TO(DEG R) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREPEND ROLL-MODEL YAW  
107 2 ORBITER S 7.97 426.0 1312 35.03 -5.03 -30.00 -120.00 -0.00  
T-INF P-INF U-INF V-INF MU-INF RHO-INF HE/FT HREF STREF  
(DEG R) (PSLA) (FT/SEC) (SLUGS/FT<sup>3</sup>) (LBS-SEC/FT<sup>2</sup>) (FT-1) (R= .0175E1) (R= .0175E1)  
95.7 .045 1.988 3021 3.918E-05 7.708E-08 1.943E 06 3.448E-02 2.915E-02  
CAMERA ROLL NO PAINT LUMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHOXCK) TRAR(TO) BETA(TO)  
TOP(Y) 8694  
SLO(S) 7272  
MOTION(B) 7139  
250 90 .0535 2.202E-01 2.3738E-01

PIC NO	TIME DELTIME	M(TO)	M(TO)/HREF	M(.910)	M(.910)/HREF	M(.92310)	M(.92310)/HREF	S(TO)
T 1105(250)	19.22	2.941E-03	.0862	3.777E-03	.1049	3.559E-03	.1026	2.476E-03
S 4334(250)	19.22	2.941E-03	.0862	3.777E-03	.1049	3.559E-03	.1026	2.476E-03
M 7050(250)	19.22	2.941E-03	.0862	3.777E-03	.1049	3.559E-03	.1026	2.476E-03
T 1106(250)	20.40	2.945E-03	.0834	3.669E-03	.1058	3.457E-03	.0997	2.405E-03
S 4440(250)	20.40	2.945E-03	.0834	3.669E-03	.1058	3.457E-03	.0997	2.405E-03
M 7061(250)	20.40	2.945E-03	.0834	3.669E-03	.1058	3.457E-03	.0997	2.405E-03
T 1107(250)	21.45	2.829E-03	.0815	3.572E-03	.1030	3.368E-03	.0970	2.341E-03
S 4441(250)	21.45	2.829E-03	.0815	3.572E-03	.1030	3.368E-03	.0970	2.341E-03
M 7062(250)	21.45	2.829E-03	.0815	3.572E-03	.1030	3.368E-03	.0970	2.341E-03
T 1108(250)	22.47	2.827E-03	.0815	3.570E-03	.1029	3.364E-03	.0970	2.339E-03
S 4442(250)	22.47	2.827E-03	.0815	3.570E-03	.1029	3.364E-03	.0970	2.339E-03
M 7063(250)	22.47	2.827E-03	.0815	3.570E-03	.1029	3.364E-03	.0970	2.339E-03
T 1109(250)	23.40	2.746E-03	.0794	3.480E-03	.1003	3.280E-03	.0945	2.279E-03
S 4443(250)	23.40	2.746E-03	.0794	3.480E-03	.1003	3.280E-03	.0945	2.279E-03
M 7064(250)	23.40	2.746E-03	.0794	3.480E-03	.1003	3.280E-03	.0945	2.279E-03
T 1110(250)	24.41	2.649E-03	.0775	3.395E-03	.0979	3.190E-03	.0922	2.225E-03
S 4444(250)	24.41	2.649E-03	.0775	3.395E-03	.0979	3.190E-03	.0922	2.225E-03
M 7065(250)	24.41	2.649E-03	.0775	3.395E-03	.0979	3.190E-03	.0922	2.225E-03
T 1111(250)	25.40	2.628E-03	.0754	3.314E-03	.0957	3.124E-03	.0902	2.176E-03
S 4445(250)	25.40	2.628E-03	.0754	3.314E-03	.0957	3.124E-03	.0902	2.176E-03
M 7066(250)	25.40	2.628E-03	.0754	3.314E-03	.0957	3.124E-03	.0902	2.176E-03
T 1112(250)	26.41	2.510E-03	.0741	3.244E-03	.0936	3.059E-03	.0882	2.127E-03
S 4446(250)	26.41	2.510E-03	.0741	3.244E-03	.0936	3.059E-03	.0882	2.127E-03
M 7067(250)	26.41	2.510E-03	.0741	3.244E-03	.0936	3.059E-03	.0882	2.127E-03
T 1113(250)	27.40	2.514E-03	.0725	3.176E-03	.0916	2.993E-03	.0861	2.081E-03
S 4447(250)	27.40	2.514E-03	.0725	3.176E-03	.0916	2.993E-03	.0861	2.081E-03
M 7068(250)	27.40	2.514E-03	.0725	3.176E-03	.0916	2.993E-03	.0861	2.081E-03
T 1114(250)	28.43	2.445E-03	.0710	3.113E-03	.0897	2.933E-03	.0845	2.039E-03

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7/10/73

MASS-RI ORBITER HEATING  
 VA290  
 AEDC(ARO-INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 56 INCH HYPERSONIC TUNNEL W

GROUP COMPIG MODEL MACH NO PO(PSIA) TO(DEG R) ALPHA-MODEL ALPHA-SECTION ALPHA-PREBEMC ROLL-MODEL YAW  
 107 2 ORBITER 5 7.97 426.4 1312 34.03 -5.03 -30.30 -180.00 -0.00

T-1AF P-INF Q-INF V-INF MU-INF RMU-INF MU-INF RE/FT MREF STREF  
 (DEG R) (PSIA) (FT/SEC) (SLUGS/FT<sup>2</sup>) (FT-1) (R<sup>2</sup>-0.175FI) (R<sup>2</sup>-0.175FI)  
 94.7 0.045 1.900 3821 3.022E-05 7.700E-08 1.044E 04 3.470E-02 2.913E-02

CAMERA ROLL NO PAINT (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHO/CAK) TBAR(TO) BETA(TO)  
 TOP(TI) 8094  
 SINE(SI) 7272 250 80 0.0335 2.202E-01 2.3730E-01  
 MOTIC(MI) 7739

PTC NO	TIME DELTIME	M(TO)	M(TO)/MREF	M(.9TO)	M(.9TO)/MREF	M(.923TO)	M(.923TO)/MREF	ST(TO)
1 1113(250)	27.26 26.54	2.464E-03	0.0710	3.111E-03	0.0097	2.932E-03	0.0045	2.038E-03
5 4947(250)	27.26 26.54	2.464E-03	0.0710	3.111E-03	0.0097	2.932E-03	0.0045	2.038E-03
MODEL WAS LEFT CENTRIFUGAL								
1 1114(250)	27.26 26.54	2.417E-03	0.0697	3.052E-03	0.0080	2.876E-03	0.0029	1.999E-03
5 4948(250)	27.26 26.54	2.417E-03	0.0697	3.052E-03	0.0080	2.876E-03	0.0029	1.999E-03
1 1115(250)	27.26 26.54	2.417E-03	0.0697	3.052E-03	0.0080	2.876E-03	0.0029	1.999E-03
5 4949(250)	27.26 26.54	2.417E-03	0.0697	3.052E-03	0.0080	2.876E-03	0.0029	1.999E-03
1 1116(250)	27.26 26.54	2.417E-03	0.0697	3.052E-03	0.0080	2.876E-03	0.0029	1.999E-03
5 4950(250)	27.26 26.54	2.417E-03	0.0697	3.052E-03	0.0080	2.876E-03	0.0029	1.999E-03
1 1117(250)	27.26 26.54	2.417E-03	0.0697	3.052E-03	0.0080	2.876E-03	0.0029	1.999E-03
5 4951(250)	27.26 26.54	2.417E-03	0.0697	3.052E-03	0.0080	2.876E-03	0.0029	1.999E-03

425

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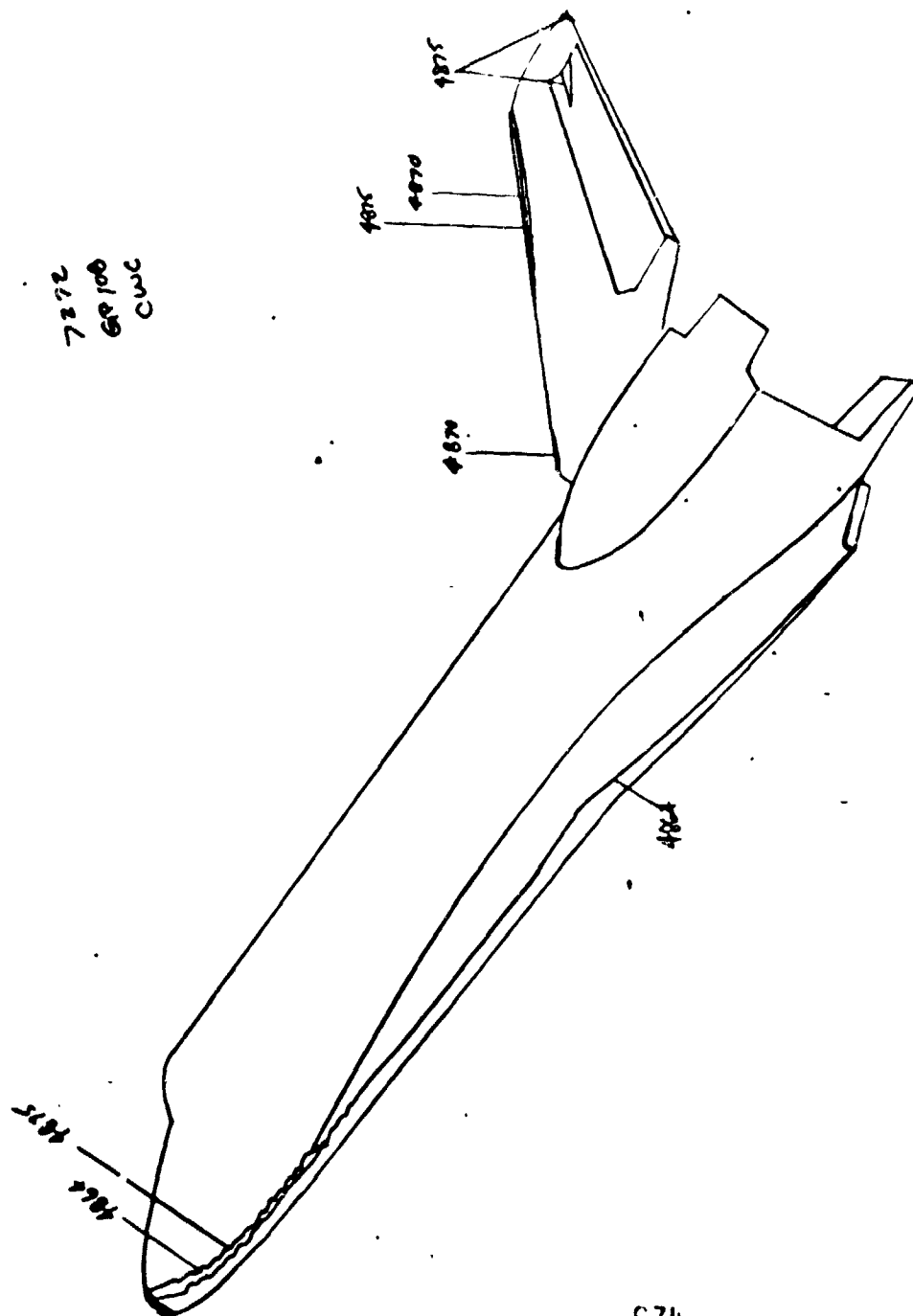


Figure 193



Group 108  
2094  
N12

8568  
 $\sigma = 35^\circ$   
 $\phi = 0^\circ$

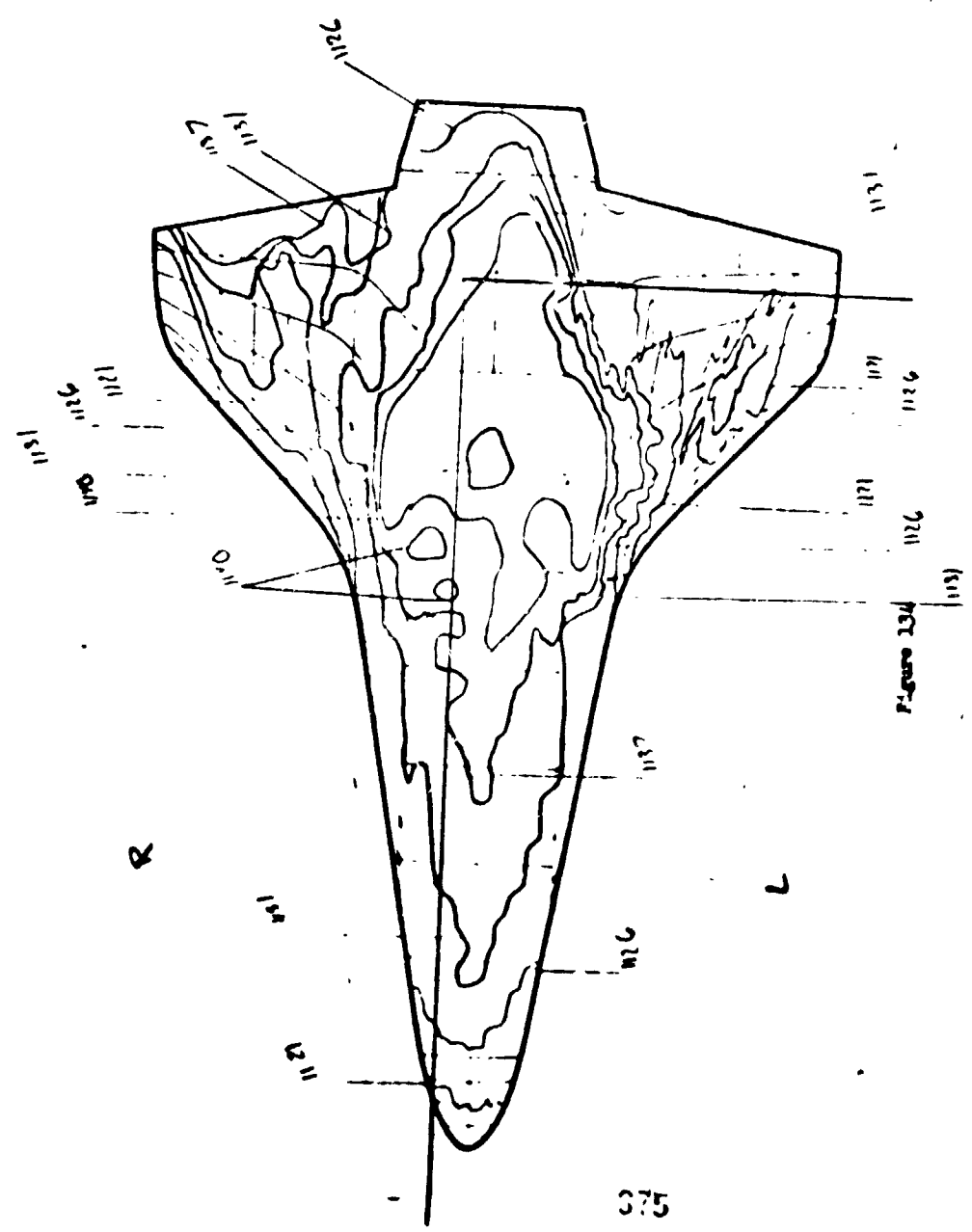


Figure 134

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7/10/73

NASA-RI ORBITER HEATING

AEDCIARO-INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL H

VA299

GROUP CNFTE MODEL MACH NO PO(PSIA) TO(DEG R) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREBEND ROLL-MODEL YAW  
 10R 5 ORBITER R2 7.97 425.9 1311 35.04 -5.04 -30.00 -180.00 --.00  
 T-INF P-INF O-INF V-INF RHO-INF MU-INF RF/FT MREF STREF  
 ID(PSIA) (PSIA) (FT/SEC) (SLUGS/FT3) (LB-SEC/FT2) (ET-1) (R-0175FI) (R-0175FI)  
 9C.5 .045 1.988 3819 3.022E-05 7.699E-08 1.945E 04 3.447E-02 2.913E-02  
 CAMERA ROLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHOXCK) TGRAT(TO) BETA(TO)  
 TOP(TI) 8094  
 SIDE(S) 7272  
 BOTTOM(B) 7739  
 250 79 .0535 0 0

PIC NO TIME RELTIME H(10) H(10)/MREF H(10) H(10)/MREF H(10)/MREF ST(10)

T 11181(250) 1.18 MODEL HAS NOT REACHED CENTERLINE  
 M 70731(250) 1.18 MODEL HAS NOT REACHED CENTERLINE  
 S 4852(250) 1.20 MODEL HAS NOT REACHED CENTERLINE  
 T 70741(250) 2.25 MODEL HAS NOT REACHED CENTERLINE  
 M 11141(250) 2.28 MODEL HAS NOT REACHED CENTERLINE  
 S 4853(250) 2.28 MODEL HAS NOT REACHED CENTERLINE  
 INJECT TIME \* 2.30 DATA NOT YET VALID  
 T 11201(250) 3.23 DATA NOT YET VALID  
 M 70751(250) 3.23 DATA NOT YET VALID  
 S 4854(250) 3.25 DATA NOT YET VALID  
 T 11211(250) 4.41 3.11 7.258E-03 .2093 9.158E-03 .2844 8.637E-03 .2491 6.003E-03  
 M 70761(250) 4.41 3.11 7.258E-03 .2093 9.158E-03 .2844 8.637E-03 .2491 6.003E-03  
 S 4855(250) 4.41 3.11 7.258E-03 .2093 9.158E-03 .2844 8.637E-03 .2491 6.003E-03  
 T 70771(250) 5.44 4.19 6.256E-03 .1904 7.903E-03 .2279 7.445E-03 .2147 5.176E-03  
 M 11221(250) 5.51 4.21 6.233E-03 .1799 7.890E-03 .2272 7.423E-03 .2141 5.160E-03  
 S 4856(250) 5.51 4.21 6.233E-03 .1799 7.890E-03 .2272 7.423E-03 .2141 5.160E-03  
 T 11231(250) 6.56 5.24 5.540E-03 .1609 7.049E-03 .2033 6.641E-03 .1915 4.616E-03  
 M 70781(250) 6.56 5.24 5.540E-03 .1609 7.049E-03 .2033 6.641E-03 .1915 4.616E-03  
 S 4857(250) 6.58 5.29 5.547E-03 .1605 7.032E-03 .2028 6.625E-03 .1911 4.606E-03  
 T 11241(250) 7.63 6.34 5.043E-03 .1466 6.423E-03 .1852 6.051E-03 .1745 4.205E-03  
 M 70791(250) 7.63 6.34 5.043E-03 .1466 6.423E-03 .1852 6.051E-03 .1745 4.205E-03  
 S 4858(250) 7.66 6.37 5.075E-03 .1463 6.410E-03 .1849 6.039E-03 .1742 4.188E-03  
 T 11251(250) 8.71 7.42 4.701E-03 .1356 5.938E-03 .1713 5.595E-03 .1613 3.888E-03  
 M 70801(250) 8.71 7.42 4.701E-03 .1356 5.938E-03 .1713 5.595E-03 .1613 3.888E-03  
 S 4859(250) 8.74 7.44 4.693E-03 .1353 5.929E-03 .1709 5.585E-03 .1610 3.881E-03  
 T 11261(250) 9.79 8.40 4.343E-03 .1267 5.550E-03 .1600 5.228E-03 .1507 3.633E-03  
 M 7081(250) 9.79 8.40 4.343E-03 .1267 5.550E-03 .1600 5.228E-03 .1507 3.633E-03  
 S 4860(250) 9.79 8.40 4.343E-03 .1267 5.550E-03 .1600 5.228E-03 .1507 3.633E-03

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7/10/73

# NASA-DI ORBITER HEATING

AEDC(ARO, INC.) ARNOLD AFB, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL R

VA200

GROUP CONFIG MODEL MACH NO PO (PSIA) TO (DEG R) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREBEND ROLL-MODEL YAW  
 104 5 CRITER R2 7.97 426.2 1311 35.04 -5.04 -30.00 -180.00 --00  
 T-1NF P-1NF Q-1NF V-1NF MU-1NF WU-1NF HU-1NF SREF  
 (DEG R) (PSIA) (FT/SEC) (LBS/SEC/FT3) (LBS/SEC/FT2) (FT-1) (R= .0175FI) (R= .0175FI)  
 95.4 .045 1.945 3010 3.924E-05 7.639E-08 1.947E 04 3.448E-02 2.912E-02  
 CAUSEA ROLL NO -AINT IFVP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHOKCK) TRAR(TO) BETA(TO)  
 TOP(T) 8094  
 TREF(S) 7272  
 BOTTOM(R) 7739  
 0.535 2.216E-01 2.3932E-01

QIC NO TIME DELTIME H(TO) HREF H(OTO) HREF H(.923TO) HREF H(.923TO) ST(TO)  
 T 1127(250) 10.66 9.57 4.139E-03 1.194 5.228E-03 1.508 4.926E-03 .1421 3.425E-03  
 S 4251(250) 10.66 9.57 4.139E-03 1.194 5.228E-03 1.508 4.926E-03 .1421 3.425E-03  
 M 7.42(250) 10.66 9.57 4.139E-03 1.194 5.228E-03 1.508 4.926E-03 .1421 3.425E-03  
 T 1127(250) 11.54 10.66 3.924E-03 1.131 4.957E-03 1.429 4.670E-03 .1346 3.245E-03  
 S 4542(250) 11.54 10.66 3.924E-03 1.131 4.957E-03 1.429 4.670E-03 .1346 3.245E-03  
 M 7083(250) 11.54 10.66 3.924E-03 1.131 4.957E-03 1.429 4.670E-03 .1346 3.245E-03  
 T 1127(250) 13.01 11.72 3.740E-03 1.078 4.724E-03 1.342 4.451E-03 .1283 3.092E-03  
 S 4553(250) 13.01 11.72 3.740E-03 1.078 4.724E-03 1.342 4.451E-03 .1283 3.092E-03  
 M 7224(250) 13.01 11.72 3.740E-03 1.078 4.724E-03 1.342 4.451E-03 .1283 3.092E-03  
 T 1131(250) 14.07 12.77 3.533E-03 1.033 4.524E-03 1.305 4.263E-03 .1229 2.963E-03  
 S 4554(250) 14.07 12.77 3.533E-03 1.033 4.524E-03 1.305 4.263E-03 .1229 2.963E-03  
 M 7045(250) 14.07 12.77 3.533E-03 1.033 4.524E-03 1.305 4.263E-03 .1229 2.963E-03  
 T 1131(250) 15.14 13.85 3.440E-03 0.992 4.342E-03 1.253 4.044E-03 .1181 2.844E-03  
 S 4555(250) 15.14 13.85 3.440E-03 0.992 4.342E-03 1.253 4.044E-03 .1181 2.844E-03  
 M 7224(250) 15.14 13.85 3.440E-03 0.992 4.342E-03 1.253 4.044E-03 .1181 2.844E-03  
 T 1131(250) 16.22 14.93 3.314E-03 0.955 4.174E-03 1.207 3.944E-03 .1137 2.740E-03  
 S 4556(250) 16.22 14.93 3.314E-03 0.955 4.174E-03 1.207 3.944E-03 .1137 2.740E-03  
 M 7045(250) 16.22 14.93 3.314E-03 0.955 4.174E-03 1.207 3.944E-03 .1137 2.740E-03  
 T 1131(250) 17.29 16.00 3.211E-03 0.923 4.043E-03 1.166 3.809E-03 .1098 2.647E-03  
 S 4557(250) 17.29 16.00 3.211E-03 0.923 4.043E-03 1.166 3.809E-03 .1098 2.647E-03  
 M 7045(250) 17.29 16.00 3.211E-03 0.923 4.043E-03 1.166 3.809E-03 .1098 2.647E-03  
 T 1131(250) 18.37 17.08 3.104E-03 0.893 3.914E-03 1.128 3.687E-03 .1063 2.562E-03  
 S 4558(250) 18.37 17.08 3.104E-03 0.893 3.914E-03 1.128 3.687E-03 .1063 2.562E-03  
 M 7045(250) 18.37 17.08 3.104E-03 0.893 3.914E-03 1.128 3.687E-03 .1063 2.562E-03  
 T 1131(250) 19.45 18.15 3.005E-03 0.866 3.794E-03 1.094 3.576E-03 .1031 2.485E-03  
 S 4559(250) 19.45 18.15 3.005E-03 0.866 3.794E-03 1.094 3.576E-03 .1031 2.485E-03  
 M 7045(250) 19.45 18.15 3.005E-03 0.866 3.794E-03 1.094 3.576E-03 .1031 2.485E-03

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7/10/73

NASA-R( ORBITER HEATING

AEUCI(ARINC-1) ARNCLU AFS, TENNESSEE  
VON KARMAN GAS DYNAMICS FACILITY  
50 INCH HYPERSONIC TUNNEL R

VADOC

GROUP CONFID MJOEL MACH NO P(PSIA) T(DEG R) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREBEND ROLL-MODEL YAW  
100 5 0.0175 7.97 426.2 1310 35.24 -5.04 -30.00 -180.00 -0.00

T-INF D-INF U-INF V-INF RHO-INF MU-INF RE/FT HREF STREF  
(DEG R) (PSIA) (FT/SEC) (SLUGS/FT<sup>3</sup>) (LBS-SEC/FT<sup>2</sup>) (FT-1) (R= .0175FT) (R= .0175FT)  
95.4 0.045 1.949 0.045 7.025E-05 7.025E-05 1.547E 04 3.448E-02 2.912E-02

CAMERA WOLL 1/0 PAINT 1/0W 1000 F INITIAL TEMP (CEU F) SQUARE ROOT (RHOXCK) TRAR(TO) BETA(TO)  
TOP(1) 4094  
510(15) 7272  
WOL(100) 7139

2.216E-01 2.3932E-01

PTC NO TIME RELTIME H(TO) H(TO)/HREF H(.970) H(.970)/HREF H(.923TO) H(.923TO)/HREF ST(TO)

T	114(1250)	20.52	19.23	0.942	3.685E-03	1.043	3.475E-03	1.002	2.414E-03
S	114(1250)	20.52	19.23	0.942	3.685E-03	1.043	3.475E-03	1.002	2.414E-03
M	114(1250)	20.52	19.23	0.942	3.685E-03	1.043	3.475E-03	1.002	2.414E-03
T	113(1250)	21.50	20.31	0.919	3.541E-03	1.035	3.331E-03	0.975	2.351E-03
S	113(1250)	21.50	20.31	0.919	3.541E-03	1.035	3.331E-03	0.975	2.351E-03
M	113(1250)	21.50	20.31	0.919	3.541E-03	1.035	3.331E-03	0.975	2.351E-03
T	113(1250)	22.45	21.34	0.909	3.495E-03	1.029	3.295E-03	0.950	2.295E-03
S	113(1250)	22.45	21.34	0.909	3.495E-03	1.029	3.295E-03	0.950	2.295E-03
M	113(1250)	22.45	21.34	0.909	3.495E-03	1.029	3.295E-03	0.950	2.295E-03
T	114(1250)	23.43	22.43	0.970	3.415E-03	1.045	3.217E-03	0.928	2.234E-03
S	114(1250)	23.43	22.43	0.970	3.415E-03	1.045	3.217E-03	0.928	2.234E-03
M	114(1250)	23.43	22.43	0.970	3.415E-03	1.045	3.217E-03	0.928	2.234E-03
T	114(1250)	24.43	23.51	0.971	3.331E-03	1.042	3.143E-03	0.926	2.183E-03
S	114(1250)	24.43	23.51	0.971	3.331E-03	1.042	3.143E-03	0.926	2.183E-03
M	114(1250)	24.43	23.51	0.971	3.331E-03	1.042	3.143E-03	0.926	2.183E-03
T	114(1250)	25.43	24.54	0.971	3.231E-03	1.041	3.041E-03	0.926	2.133E-03
S	114(1250)	25.43	24.54	0.971	3.231E-03	1.041	3.041E-03	0.926	2.133E-03
M	114(1250)	25.43	24.54	0.971	3.231E-03	1.041	3.041E-03	0.926	2.133E-03
T	114(1250)	26.44	25.54	0.974	3.143E-03	1.040	3.041E-03	0.926	2.133E-03
S	114(1250)	26.44	25.54	0.974	3.143E-03	1.040	3.041E-03	0.926	2.133E-03
M	114(1250)	26.44	25.54	0.974	3.143E-03	1.040	3.041E-03	0.926	2.133E-03
T	114(1250)	27.44	26.54	0.974	3.041E-03	1.040	3.041E-03	0.926	2.133E-03
S	114(1250)	27.44	26.54	0.974	3.041E-03	1.040	3.041E-03	0.926	2.133E-03
M	114(1250)	27.44	26.54	0.974	3.041E-03	1.040	3.041E-03	0.926	2.133E-03
T	114(1250)	28.44	27.54	0.974	3.041E-03	1.040	3.041E-03	0.926	2.133E-03
S	114(1250)	28.44	27.54	0.974	3.041E-03	1.040	3.041E-03	0.926	2.133E-03
M	114(1250)	28.44	27.54	0.974	3.041E-03	1.040	3.041E-03	0.926	2.133E-03
T	114(1250)	29.44	28.54	0.974	3.041E-03	1.040	3.041E-03	0.926	2.133E-03
S	114(1250)	29.44	28.54	0.974	3.041E-03	1.040	3.041E-03	0.926	2.133E-03
M	114(1250)	29.44	28.54	0.974	3.041E-03	1.040	3.041E-03	0.926	2.133E-03

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WASA-RI ORBITER PEATING AEDCIARO, INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL R

WAZR9

GROUP CONFIG MODEL MACH NO PO(PSIA) TO(DEG R) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREBEND ROLL-MODEL YAW  
 109 5 ORBITER R2 7.97 426.3 1310 35.04 -5.04 -30.00 -180.00 --.00  
 T-INF P-INF Q-INF V-INF MU-INF MU-INF RE/FT MREF STREF  
 (DEG R) (PSIA) (FT/SEC) (SLUGS/FT<sup>3</sup>) (LB-SEC/FT<sup>2</sup>) (ET-1) (R<sub>0</sub>-.0175ET) (R<sub>0</sub>-.0175ET)  
 95.4 .045 1.989 3819 3.926E-05 7.699E-08 1.947E 06 3.449E-02 2.912E-02  
 CAMERA HOLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHOXCAK) TRAR(TO) BETA(TO)  
 TOP(T) 8094  
 SIDE(S) 7272  
 BOTTOM(B) 7779 259 79 .0535 2.216E-01 2.3932E-01

PIC NO	TIME DELTIME	H(TO)	H(TO)/MREF	M(.9TO)	M(.9TO)/MREF	M(.923TO)	M(.923TO)/MREF	ST(TO)
T 1144(250)	29.11 27.82	2.428E-03	.0700	3.067E-03	.0884	2.889E-03	.0833	2.007E-03
S 4878(250)	29.11 27.82	2.428E-03	.0700	3.067E-03	.0884	2.889E-03	.0833	2.007E-03
M 7099(250)	29.11 27.82	2.428E-03	.0700	3.067E-03	.0884	2.889E-03	.0833	2.007E-03
T 1145(250)	30.18 28.89	2.342E-03	.0697	3.009E-03	.0867	2.835E-03	.0817	1.969E-03
S 4879(250)	30.18 28.89	2.342E-03	.0697	3.009E-03	.0867	2.835E-03	.0817	1.969E-03
M 7100(250)	30.18 28.89	2.342E-03	.0697	3.009E-03	.0867	2.835E-03	.0817	1.969E-03
T 1146(250)	31.26 29.97	2.339E-03	.0674	2.955E-03	.0852	2.783E-03	.0802	1.933E-03
S 4880(250)	31.26 29.97	2.339E-03	.0674	2.955E-03	.0852	2.783E-03	.0802	1.933E-03
M 7101(250)	31.26 29.97	2.339E-03	.0674	2.955E-03	.0852	2.783E-03	.0802	1.933E-03
T 1147(250)	32.34 31.04	2.248E-03	.0662	2.903E-03	.0837	2.735E-03	.0788	1.900E-03
S 4881(250)	32.34 31.04	2.248E-03	.0662	2.903E-03	.0837	2.735E-03	.0788	1.900E-03
M 7102(250)	32.34 31.04	2.248E-03	.0662	2.903E-03	.0837	2.735E-03	.0788	1.900E-03

7272  
GP109  
Cue

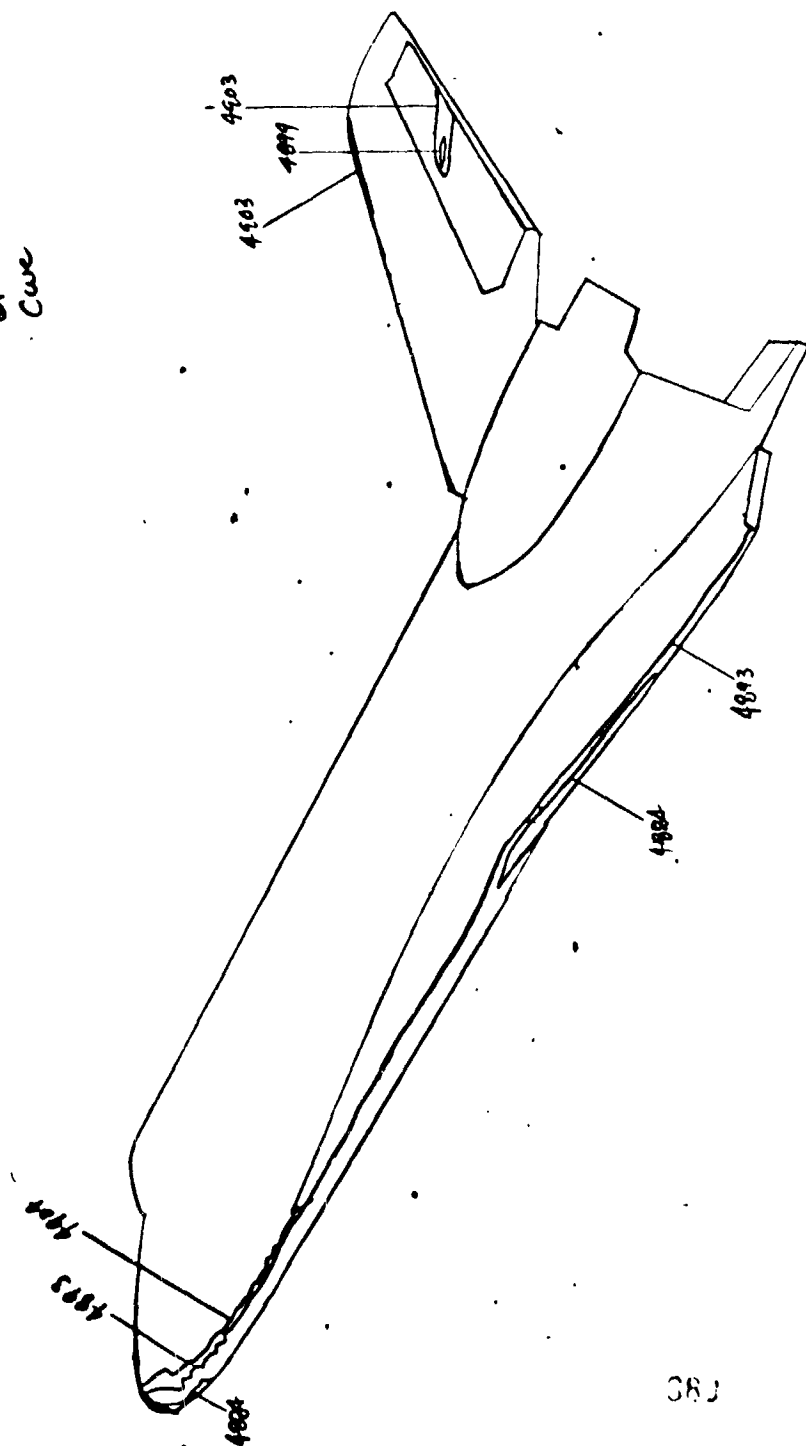
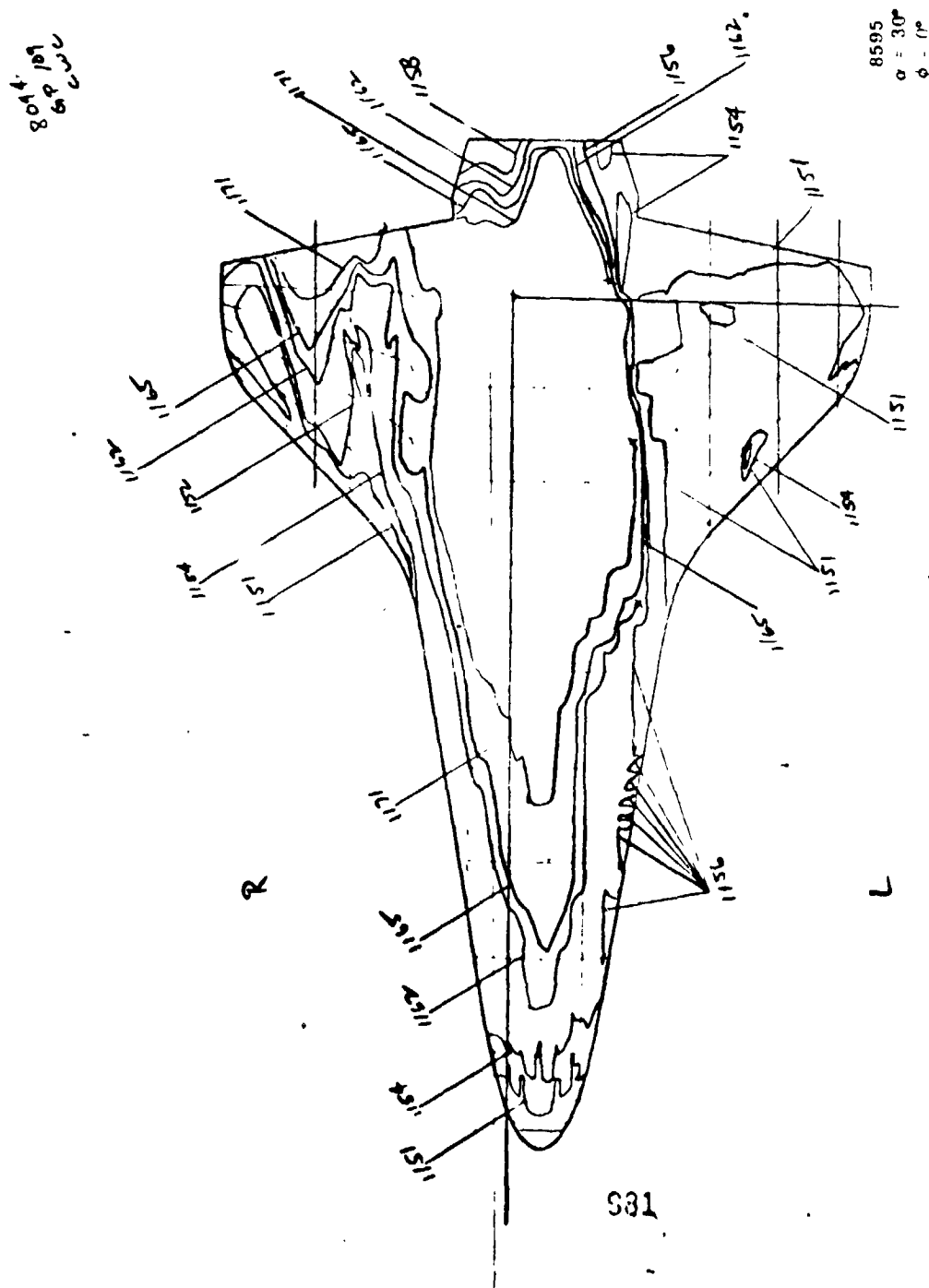


Figure 135



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7/10/73

NASA-RI ORBITER HEATING

AEDC (ARO, INC.) ARNOLD AFS, TENNESSEE  
VON KARMAN GAS DYNAMICS FACILITY  
50 INCH HYPERSONIC TUNNEL R

VA249

GROUP CONFIG MODEL MACH NO PO (PSIA) TO (DEG R) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREBEND ROLL-MODEL YAW  
109 6 ORBITER R3 7.97 424.9 1310 30.01 -.01 -30.00 -180.00 -.00  
T-INF P-TMF Q-INF V-INF MU-INF RE/FT HREF STREF  
(DEG R) (PSIA) (FT/SEC) (SLUGS/FT<sup>3</sup>) (LB-SEC/FT<sup>2</sup>) (FI-1) (R=.0175FI) (R=.0175FI)  
95.4 -.045 1.983 3814 3.915E-05 7.695E-08 1.942E 06 3.443E-02 2.916E-02  
CAUSEA HOLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHOXCKX) TBAR(TO) BETA(TO)  
TOP(T) RC94 80 .0535 0 0  
SIDE(S) 7272 250  
MOTOM(B) 7739

PTC NO TIME DELTIME H(TO) H(TO)/HREF H(.910) H(.910)/HREF H(.912TO)/HREF ST(TO)  
M 7103(250) 1 15 MODEL HAS NOT REACHED CENTERLINE  
T 114(250) 1 18 MODEL HAS NOT REACHED CENTERLINE  
S 4892(250) 1.18 MODEL HAS NOT REACHED CENTERLINE  
M 7104(250) 2.23 MODEL HAS NOT REACHED CENTERLINE  
T 1149(250) 2.25 MODEL HAS NOT REACHED CENTERLINE  
S 4893(250) 2.25 MODEL HAS NOT REACHED CENTERLINE  
INJECT TIME = 2.28  
T 1151(250) 3.30 DATA NOT YET VALID  
S 4894(250) 3.30 DATA NOT YET VALID  
M 7105(250) 3.30 DATA NOT YET VALID  
T 1151(250) 4.34 3.10 7.241E-03 9.150E-03 .2441 8.859E-03 .2558 6.000E-03  
S 4895(250) 4.34 3.10 7.241E-03 9.150E-03 .2441 8.859E-03 .2558 6.000E-03  
M 7106(250) 4.34 3.10 7.241E-03 9.150E-03 .2441 8.859E-03 .2558 6.000E-03  
T 1152(250) 5.43 4.16 6.234E-03 7.907E-03 .2282 7.656E-03 .2210 5.183E-03  
S 4896(250) 5.43 4.16 6.234E-03 7.907E-03 .2282 7.656E-03 .2210 5.183E-03  
M 7107(250) 5.43 4.16 6.234E-03 7.907E-03 .2282 7.656E-03 .2210 5.183E-03  
T 1153(250) 6.51 5.23 5.577E-03 7.047E-03 .2076 6.823E-03 .2203 5.169E-03  
S 4897(250) 6.51 5.23 5.577E-03 7.047E-03 .2076 6.823E-03 .2203 5.169E-03  
M 7108(250) 6.51 5.23 5.577E-03 7.047E-03 .2076 6.823E-03 .2203 5.169E-03  
T 1154(250) 7.58 6.31 5.077E-03 6.417E-03 .1852 6.213E-03 .1793 4.206E-03  
S 4898(250) 7.58 6.31 5.077E-03 6.417E-03 .1852 6.213E-03 .1793 4.206E-03  
M 7109(250) 8.66 7.38 4.644E-03 5.931E-03 .1712 5.743E-03 .1658 3.888E-03  
T 1155(250) 8.66 7.38 4.644E-03 5.931E-03 .1712 5.743E-03 .1658 3.888E-03  
S 4899(250) 8.66 7.38 4.644E-03 5.931E-03 .1712 5.743E-03 .1658 3.888E-03  
M 7110(250) 9.71 8.43 4.341E-03 5.549E-03 .1601 5.373E-03 .1551 3.636E-03  
T 1156(250) 9.71 8.43 4.341E-03 5.549E-03 .1601 5.373E-03 .1551 3.636E-03  
S 4900(250) 9.71 8.43 4.341E-03 5.549E-03 .1601 5.373E-03 .1551 3.636E-03

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PIC NO	TIME DELTIVE	M(TO)	M(TO)/MREF	M(.910)	M(.912TO)/MREF	M(.912TO)	ST(TO)
T 1156(250)	9.74	4.345E-03	.1265	5.541E-03	5.365E-03	.1548	3.031E-03
S 4901(250)	9.74	4.345E-03	.1265	5.541E-03	5.365E-03	.1548	3.031E-03
M 7112(250)	10.19	4.135E-03	.1193	5.225E-03	5.060E-03	.1460	3.424E-03
T 1157(250)	10.21	4.130E-03	.1192	5.219E-03	5.053E-03	.1458	3.420E-03
S 4901(250)	10.21	4.130E-03	.1192	5.219E-03	5.053E-03	.1458	3.420E-03
M 7113(250)	11.26	3.919E-03	.1132	4.951E-03	4.795E-03	.1430	3.248E-03
T 1158(250)	11.26	3.919E-03	.1132	4.951E-03	4.795E-03	.1430	3.248E-03
S 4902(250)	11.29	3.915E-03	.1130	4.947E-03	4.790E-03	.1427	3.248E-03
T 1159(250)	12.54	3.734E-03	.1074	4.719E-03	4.569E-03	.1362	3.091E-03
S 4903(250)	12.54	3.734E-03	.1074	4.719E-03	4.569E-03	.1362	3.091E-03
M 7114(250)	12.54	3.573E-03	.1031	4.515E-03	4.372E-03	.1310	2.958E-03
T 1160(250)	12.74	3.573E-03	.1031	4.515E-03	4.372E-03	.1310	2.958E-03
S 4904(250)	12.74	3.573E-03	.1031	4.515E-03	4.372E-03	.1310	2.958E-03
M 7115(250)	14.02	3.346E-03	.0991	4.339E-03	4.202E-03	.1252	2.842E-03
T 1161(250)	15.09	3.346E-03	.0991	4.339E-03	4.202E-03	.1252	2.842E-03
S 4905(250)	15.09	3.346E-03	.0991	4.339E-03	4.202E-03	.1252	2.842E-03
M 7116(250)	15.14	3.077E-03	.0954	4.179E-03	4.047E-03	.1211	2.640E-03
T 1162(250)	15.14	3.077E-03	.0954	4.179E-03	4.047E-03	.1211	2.640E-03
S 4906(250)	15.14	3.077E-03	.0954	4.179E-03	4.047E-03	.1211	2.640E-03
M 7117(250)	16.17	3.355E-03	.0953	4.179E-03	4.047E-03	.1169	2.737E-03
T 1163(250)	17.22	3.154E-03	.0921	4.036E-03	3.904E-03	.1167	2.737E-03
S 4907(250)	17.22	3.154E-03	.0921	4.036E-03	3.904E-03	.1167	2.737E-03
M 7118(250)	17.22	3.154E-03	.0921	4.036E-03	3.904E-03	.1167	2.737E-03
T 1164(250)	18.20	3.041E-03	.0892	3.904E-03	3.782E-03	.1127	2.643E-03
S 4908(250)	18.20	3.041E-03	.0892	3.904E-03	3.782E-03	.1127	2.643E-03
M 7119(250)	18.20	3.041E-03	.0892	3.904E-03	3.782E-03	.1127	2.643E-03
T 1165(250)	18.20	3.041E-03	.0892	3.904E-03	3.782E-03	.1127	2.643E-03
S 4909(250)	18.20	3.041E-03	.0892	3.904E-03	3.782E-03	.1127	2.643E-03
M 7120(250)	18.20	3.041E-03	.0892	3.904E-03	3.782E-03	.1127	2.643E-03

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7/10/73

NASA-R1 ORBITER HEATING

AEDC (AO-1AC-1) ARNOLD AFS, TENNESSEE  
VON KARMAN GAS DYNAMICS FACILITY  
50 INCH HYPERSONIC TUNNEL R

VA289

GROUP	CONFIG	MODEL	MACH NO	PO (PSIA)	TO (DEG R)	ALPHA-MODEL	ALPHA-SECTOR	ALPHA-PREBEND	ROLL-MODEL	YAW
109	6	ORBITER R3	7.97	425.7	1310	30.01	-0.01	-30.00	-180.00	-0.00
T-1NF	P-1NF	Q-1NF	V-1NF	RHO-1NF	MU-1NF	RE/FT	MREF	SIREF		
(DEG R)	(PSIA)	(FT/SEC)	(SLUGS/FT <sup>2</sup> )	(LB-SEC/FT <sup>2</sup> )	(FT-1)	(R <sup>2</sup> = 0.175E1)	(R <sup>2</sup> = 0.175E1)			
95.4	.065	1.947	3A1A	3.023E-05	7.693E-08	1.847E-06	3.446E-02	2.913E-02		
CAMERA	ROLL NO	PAINT IFMP (DEG F)	INITIAL TEMP (DEG F)	SQUARE ROOT (RHOXCAK)	THAR (TO)	BETA (TO)				
TOP (IT)	8094									
SINF (SI)	7272	250	80	.0535	2.209E-01	2.3835E-01				
NOT (MIN)	7739									

PIC NO	TIME DELTIME	M (10)	M (10)/MREF	M (.9120)	M (.9120)/MREF	M (.9120)	M (.9120)/MREF	ST (TO)
T 1165 (250)	19.27	19.09	.0865	3.788E-03	.1003	3.668E-03	.1058	2.481E-03
S 4909 (250)	19.37	19.09	.0865	3.788E-03	.1003	3.668E-03	.1058	2.481E-03
M 7126 (250)	19.27	19.09	.0865	3.788E-03	.1003	3.668E-03	.1058	2.481E-03
T 1166 (250)	20.42	19.14	.0841	3.693E-03	.1042	3.566E-03	.1028	2.410E-03
S 4902 (250)	20.45	19.17	.0840	3.690E-03	.1042	3.563E-03	.1028	2.410E-03
M 7121 (250)	20.45	19.17	.0840	3.690E-03	.1042	3.563E-03	.1028	2.410E-03
T 1122 (250)	21.50	20.22	.0919	3.583E-03	.1033	3.470E-03	.1001	2.346E-03
S 4901 (250)	21.52	20.25	.0917	3.581E-03	.1033	3.467E-03	.1000	2.344E-03
M 7123 (250)	21.52	20.25	.0917	3.581E-03	.1033	3.467E-03	.1000	2.344E-03
T 1164 (250)	22.58	21.34	.0797	3.492E-03	.1007	3.381E-03	.0975	2.287E-03
S 4902 (250)	22.50	21.32	.0797	3.490E-03	.1007	3.379E-03	.0975	2.286E-03
M 7124 (250)	22.55	22.37	.0779	3.407E-03	.0983	3.294E-03	.0951	2.230E-03
T 117 (250)	23.58	22.40	.0778	3.407E-03	.0983	3.294E-03	.0951	2.230E-03
S 4904 (250)	23.55	24.28	.0764	3.270E-03	.0943	3.167E-03	.0913	2.141E-03
M 7125 (250)	23.55	24.28	.0764	3.270E-03	.0943	3.167E-03	.0913	2.141E-03
T 1171 (250)	27.58	25.30	.0717	3.142E-03	.0906	3.042E-03	.0877	2.056E-03
S 4905 (250)	27.61	26.31	.0717	3.140E-03	.0906	3.041E-03	.0877	2.055E-03
M 7127 (250)	28.61	28.37	.0691	3.027E-03	.0873	2.931E-03	.0845	1.980E-03
T 1172 (250)	28.63	28.34	.0691	3.026E-03	.0873	2.930E-03	.0845	1.980E-03
S 4906 (250)	28.63	28.34	.0691	3.026E-03	.0873	2.930E-03	.0845	1.980E-03

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7/18/73

AEDC(ARNT-1AC) ARNOLD AFS, TENNESSEE  
VON KARMAN GAS DYNAMICS FACILITY  
50 INCH HYPERSONIC TUNNEL R

MAS-RI ORBITER HEATING

VA289

GROUP CONFID MODEL MACH NO PO(PISA) TO(DEC C) ALPHA-MODEL ALPHA-SECTION ALPHA-PREBEND ROLL-MODEL YAW  
110 2 ORBITER S 7.97 425.4 1304 44.80 -14.80 -30.00 -180.00 --00

T-INF P-TNF O-INF V-INF MU-INF MU-INF DE/FT MREF STREF  
(DEC M) (PISA) (PISA) (FT/SEC) (SLUGS/FT) (LH-SEC/FT) (FT-1) (R= .0175FT) (R= .0175FT)  
95.5 .045 1.985 3017 3.921E-05 7.691E-08 1.546E 06 3.465E-02 2.913E-02

CAMERA ROLL NO PAINT IFMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RMORCAK) YBAR(10) BETA(10)

TOP(1) 8894  
SIDE(1) 7272  
ROT(10) 7739  
M1 .0544 0 0

PIC NO TIME RELTIME MITC MITO/MREF M(.910) M(.944TO) M(.944TO)/MREF ST(10)

M 7128(100) 1.15 MODEL WAS NOT REACHED CENTERLINE  
T 7130(100) 1.18 MODEL WAS NOT REACHED CENTERLINE  
M 7132(100) 1.21 MODEL WAS NOT REACHED CENTERLINE  
T 7134(100) 1.24 MODEL WAS NOT REACHED CENTERLINE  
S 7136(100) 1.27 MODEL WAS NOT REACHED CENTERLINE

INJECT TIME = 2.30

T 7138(100) 1.30 DATA NOT YET VALID

M 7140(100) 1.33 DATA NOT YET VALID

S 7142(100) 1.36 DATA NOT YET VALID

T 7144(100) 1.39 DATA NOT YET VALID

M 7146(100) 1.42 DATA NOT YET VALID

S 7148(100) 1.45 DATA NOT YET VALID

T 7150(100) 1.48 DATA NOT YET VALID

M 7152(100) 1.51 DATA NOT YET VALID

S 7154(100) 1.54 DATA NOT YET VALID

T 7156(100) 1.57 DATA NOT YET VALID

M 7158(100) 1.60 DATA NOT YET VALID

S 7160(100) 1.63 DATA NOT YET VALID

T 7162(100) 1.66 DATA NOT YET VALID

M 7164(100) 1.69 DATA NOT YET VALID

S 7166(100) 1.72 DATA NOT YET VALID

T 7168(100) 1.75 DATA NOT YET VALID

M 7170(100) 1.78 DATA NOT YET VALID

S 7172(100) 1.81 DATA NOT YET VALID

T 7174(100) 1.84 DATA NOT YET VALID

M 7176(100) 1.87 DATA NOT YET VALID

S 7178(100) 1.90 DATA NOT YET VALID

T 7180(100) 1.93 DATA NOT YET VALID

M 7182(100) 1.96 DATA NOT YET VALID

S 7184(100) 1.99 DATA NOT YET VALID

T 7186(100) 2.02 DATA NOT YET VALID

M 7188(100) 2.05 DATA NOT YET VALID

S 7190(100) 2.08 DATA NOT YET VALID

T 7192(100) 2.11 DATA NOT YET VALID

M 7194(100) 2.14 DATA NOT YET VALID

S 7196(100) 2.17 DATA NOT YET VALID

T 7198(100) 2.20 DATA NOT YET VALID

M 7200(100) 2.23 DATA NOT YET VALID

S 7202(100) 2.26 DATA NOT YET VALID

T 7204(100) 2.29 DATA NOT YET VALID

M 7206(100) 2.32 DATA NOT YET VALID

S 7208(100) 2.35 DATA NOT YET VALID

T 7210(100) 2.38 DATA NOT YET VALID

M 7212(100) 2.41 DATA NOT YET VALID

S 7214(100) 2.44 DATA NOT YET VALID

T 7216(100) 2.47 DATA NOT YET VALID

M 7218(100) 2.50 DATA NOT YET VALID

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7/19/73

AEDC(ARO-INC.) ARNOLD AFS, TENNESSEE  
 YON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL W

NASA-RI WRITER PEATING

VA289

GROUP CNF16 MODEL MACH NO PO(PSTIA) TO(DEG R) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREBEND ROLL-MODEL YAW

110 7 GREYER S 7.97 425.5 1309 44.00 -14.00 -30.00 -100.00 -0.00

T-TAF P-INF Q-INF V-INF RHO-INF MU INF HE/FT MREF SIMEF

(DEG R) (PSTIA) (FT/SEC) (SLUGS/FT3) (LBS-SEC/FT2) (FT-LB) (R= .0175FI) (R= .0175FI)

95.6 .05 1.998 3017 3.976E-05 7.691F-08 1.948E 06 3.447E-02 2.011E-02

CAPERA ROLL NO PAINT TEMP (DEG F) T LAL TEMP (DEG F) SQUARE ROOT (RHO/CAPKA) TRAR(TO) BETAR(TO)

TOP(FT) 8094

SIDE(FT) 7272

WIDTH(FT) 7739

MIC NO TIME DELTME M(TOI) M(TOI)/MREF M(-9TO) M(-944TO) M(-944TO)/MREF ST(1TO)

T 1141(100) 9.76 8.47 4.156E-03 .1776 7.944E-03 .2292 7.037E-03 .2030 5.080E-03

M 7137(100) 10.79 9.49 5.814E-03 .1677 7.502E-03 .2144 6.644E-03 .1917 4.794E-03

T 1142(100) 10.81 9.52 5.807E-03 .1675 7.497E-03 .2141 6.637E-03 .1914 4.789E-03

S 4914(100) 10.81 9.52 5.807E-03 .1675 7.497E-03 .2141 6.637E-03 .1914 4.789E-03

M 7138(100) 11.66 10.57 4.510E-03 .1589 7.110E-03 .2051 6.298E-03 .1817 4.545E-03

T 1183(100) 11.29 10.60 5.504E-03 .1588 7.102E-03 .2049 6.291E-03 .1815 4.540E-03

S 4917(100) 11.29 10.60 5.504E-03 .1588 7.102E-03 .2049 6.291E-03 .1815 4.540E-03

T 1184(100) 12.54 11.65 4.250E-03 .1514 6.774E-03 .1954 6.006E-03 .1731 4.328E-03

M 7139(100) 12.54 11.65 4.250E-03 .1514 6.774E-03 .1954 6.006E-03 .1731 4.328E-03

T 4918(100) 12.66 11.67 5.244E-03 .1512 6.766E-03 .1951 5.994E-03 .1728 4.323E-03

M 7140(100) 14.02 12.72 5.023E-03 .1448 6.491E-03 .1849 5.741E-03 .1655 4.140E-03

S 4919(100) 14.02 12.72 5.023E-03 .1448 6.491E-03 .1849 5.741E-03 .1655 4.140E-03

T 7140(100) 14.02 12.72 5.023E-03 .1448 6.491E-03 .1849 5.741E-03 .1655 4.140E-03

M 7140(100) 15.09 13.80 4.823E-03 .1391 6.273E-03 .1795 5.512E-03 .1590 3.976E-03

T 4920(100) 15.09 13.80 4.823E-03 .1391 6.273E-03 .1795 5.512E-03 .1590 3.976E-03

M 7141(100) 15.09 13.80 4.823E-03 .1391 6.273E-03 .1795 5.512E-03 .1590 3.976E-03

T 1187(100) 16.14 14.86 4.649E-03 .1341 5.990E-03 .1730 5.314E-03 .1533 3.834E-03

M 7142(100) 16.14 14.86 4.649E-03 .1341 5.990E-03 .1730 5.314E-03 .1533 3.834E-03

S 4921(100) 16.17 14.86 4.645E-03 .1340 5.984E-03 .1729 5.308E-03 .1533 3.830E-03

M 7143(100) 17.19 15.90 4.473E-03 .1294 5.797E-03 .1672 5.135E-03 .1481 3.705E-03

T 1188(100) 17.22 15.92 4.469E-03 .1295 5.793E-03 .1671 5.131E-03 .1480 3.702E-03

M 4922(100) 17.22 15.92 4.469E-03 .1295 5.793E-03 .1671 5.131E-03 .1480 3.702E-03

T 7144(100) 18.27 16.98 4.348E-03 .1254 5.410E-03 .1617 4.970E-03 .1433 3.592E-03

M 1189(100) 18.20 17.00 4.345E-03 .1253 5.406E-03 .1616 4.966E-03 .1432 3.581E-03

S 4923(100) 18.30 17.00 4.345E-03 .1253 5.406E-03 .1616 4.966E-03 .1432 3.581E-03

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7/11/73

ADDC(ARO, INC.) ARNOLD AFS, TENNESSEE  
VON KARMAN GAS DYNAMICS FACILITY  
50 INCH HYPERSONIC TUNNEL A

NASA-RI ORBITER HEATING

VA209

GROUP CONFIG MODEL MACH NO PO (PSIA) TO (DEG R) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREBEND ROLL-MODEL YAW  
110 2 0REITER S 7.07 426.3 1309 44.00 -14.80 -30.00 -180.00 --.00

T-INF P-INF Q-INF V-INF MU-INF MU-INF RE/FT HREF STREF  
(DEG R) (PSIA) (FT/SEC) (SLUGS/FT<sup>3</sup>) (LH-SEC/FT<sup>2</sup>) (FI-1) (IR-0.0175E1) (H-0.0175E1)  
95.5 .005 1.049 3.017 7.691E-05 3.029E-05 1.950E 06 3.448E-02 2.910E-02

CAMERA ROLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RMORCK) T8AR(10) (ETA(10))  
TOP(1) 8694  
SICF(S) 7272  
MOTOM(B) 7239

2.851E-01 3.2331E-01

R1

300

R1

0.0544

PIC NO	TIME DELT (SEC)	H(10)	M(T0)/HREF	M(-910)	M(-910)/HREF	M(-94410)	M(-94410)/HREF	ST(10)
1190(100)	19.35 18.05	4.216E-03	1216	5.441E-03	1569	4.819E-03	1390	3.476E-03
4924(100)	19.35 18.05	4.216E-03	1216	5.441E-03	1569	4.819E-03	1390	3.476E-03
7145(100)	19.35 18.05	4.216E-03	1216	5.441E-03	1569	4.819E-03	1390	3.476E-03
1190(100)	20.50 19.11	4.096E-03	1182	5.289E-03	1525	4.685E-03	1350	3.377E-03
4924(100)	20.50 19.11	4.096E-03	1182	5.289E-03	1525	4.685E-03	1350	3.377E-03
7145(100)	20.50 19.11	4.096E-03	1182	5.289E-03	1525	4.685E-03	1350	3.377E-03
1190(100)	20.52 19.13	4.096E-03	1181	5.289E-03	1524	4.682E-03	1350	3.377E-03
4924(100)	20.52 19.13	4.096E-03	1181	5.289E-03	1524	4.682E-03	1350	3.377E-03
7145(100)	20.52 19.13	4.096E-03	1181	5.289E-03	1524	4.682E-03	1350	3.377E-03
1190(100)	21.50 20.21	3.948E-03	1150	5.144E-03	1484	4.558E-03	1314	3.287E-03
4924(100)	21.50 20.21	3.948E-03	1150	5.144E-03	1484	4.558E-03	1314	3.287E-03
7145(100)	21.50 20.21	3.948E-03	1150	5.144E-03	1484	4.558E-03	1314	3.287E-03
1190(100)	21.50 20.21	3.948E-03	1149	5.143E-03	1483	4.555E-03	1313	3.284E-03
4924(100)	21.50 20.21	3.948E-03	1149	5.143E-03	1483	4.555E-03	1313	3.284E-03
7145(100)	21.50 20.21	3.948E-03	1149	5.143E-03	1483	4.555E-03	1313	3.284E-03
1190(100)	23.13 21.83	3.814E-03	1106	4.947E-03	1426	4.382E-03	1244	3.160E-03
4924(100)	23.13 21.83	3.814E-03	1106	4.947E-03	1426	4.382E-03	1244	3.160E-03
7145(100)	23.13 21.83	3.814E-03	1106	4.947E-03	1426	4.382E-03	1244	3.160E-03
1190(100)	23.15 21.84	3.814E-03	1105	4.946E-03	1425	4.380E-03	1243	3.157E-03
4924(100)	23.15 21.84	3.814E-03	1105	4.946E-03	1425	4.380E-03	1243	3.157E-03
7145(100)	23.15 21.84	3.814E-03	1105	4.946E-03	1425	4.380E-03	1243	3.157E-03
1190(100)	23.18 21.85	3.664E-03	1057	4.730E-03	1364	4.190E-03	1208	3.021E-03
4924(100)	23.18 21.85	3.664E-03	1057	4.730E-03	1364	4.190E-03	1208	3.021E-03
7145(100)	23.18 21.85	3.664E-03	1057	4.730E-03	1364	4.190E-03	1208	3.021E-03
1190(100)	23.21 21.86	3.519E-03	1015	4.541E-03	1309	4.023E-03	1160	2.900E-03
4924(100)	23.21 21.86	3.519E-03	1015	4.541E-03	1309	4.023E-03	1160	2.900E-03
7145(100)	23.21 21.86	3.519E-03	1015	4.541E-03	1309	4.023E-03	1160	2.900E-03
1190(100)	25.01 24.01	MODEL WAS LEFT CENTERLINE						
4924(100)	25.01 24.01	MODEL WAS LEFT CENTERLINE						
7145(100)	25.01 24.01	MODEL WAS LEFT CENTERLINE						
1190(100)	25.03 24.03	3.349E-03	0977	4.373E-03	1241	3.874E-03	1117	2.792E-03
4924(100)	25.03 24.03	3.349E-03	0977	4.373E-03	1241	3.874E-03	1117	2.792E-03
7145(100)	25.03 24.03	3.349E-03	0977	4.373E-03	1241	3.874E-03	1117	2.792E-03
1190(100)	25.04 24.04	3.273E-03	0943	4.273E-03	1217	3.741E-03	1078	2.696E-03
4924(100)	25.04 24.04	3.273E-03	0943	4.273E-03	1217	3.741E-03	1078	2.696E-03
7145(100)	25.04 24.04	3.273E-03	0943	4.273E-03	1217	3.741E-03	1078	2.696E-03
1190(100)	25.07 24.07	3.273E-03	0943	4.273E-03	1217	3.741E-03	1078	2.696E-03
4924(100)	25.07 24.07	3.273E-03	0943	4.273E-03	1217	3.741E-03	1078	2.696E-03
7145(100)	25.07 24.07	3.273E-03	0943	4.273E-03	1217	3.741E-03	1078	2.696E-03

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Group III.  
7739  
MO

4525  
 $\alpha = 25^\circ$   
 $\phi = 0^\circ$

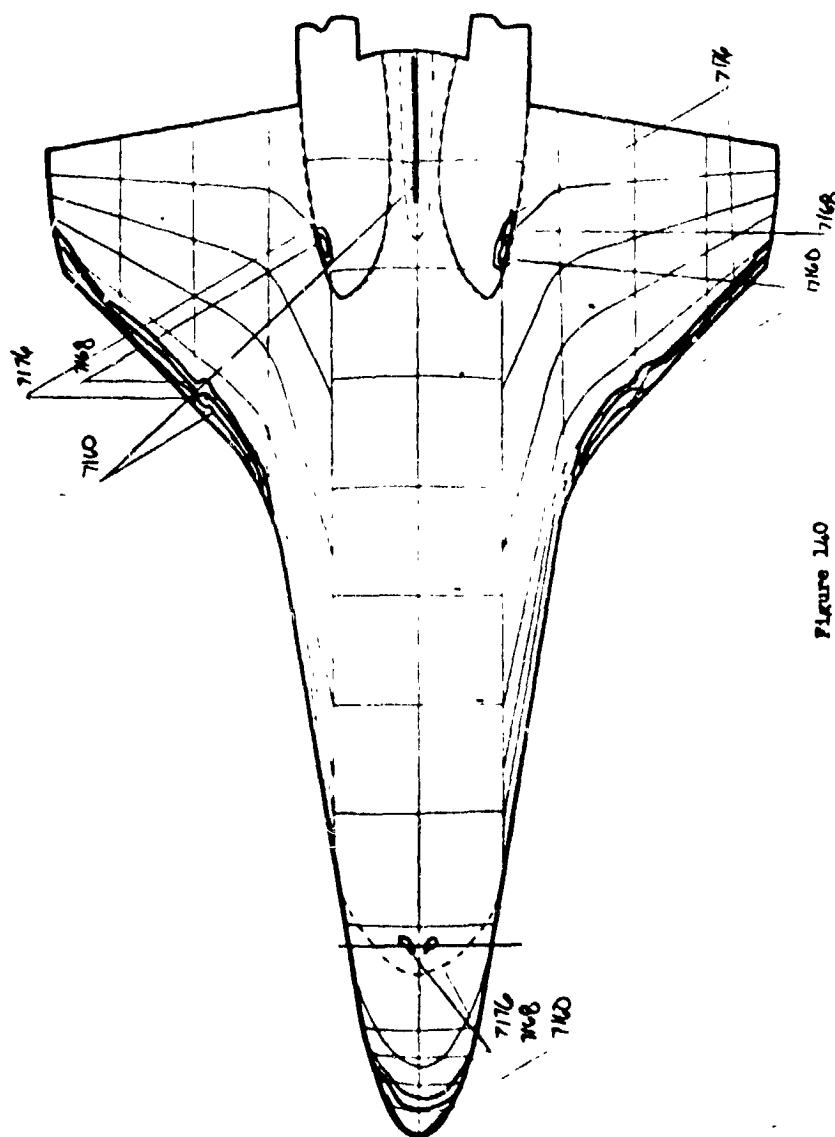


Figure 140



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7/10/73

AEDC(ARQ-1AC) ARNOLD AFS, TENNESSEE  
VON KARMAN GAS DYNAMICS FACILITY  
50 INCH HYPERSONIC TUNNEL R

MASA-RI ORBITER HEATING

VA209

GROUP CONFID MODEL MACH NO PO(PSIA) TO(DEG R) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREBEND ROLL-MODEL YAW  
111 5 ORBITER R2 7.97 426.5 1309 25.01 4.99 -30.00 -180.00 -0.00

T-INF P-INF Q-INF V-INF MU-INF RHO-INF RE/FT MREF STREF  
(DEG R) (PSIA) (FT/SEC) (SLUGS/FT<sup>3</sup>) (LB-SEC/FT<sup>2</sup>) (FT-1) (R<sup>2</sup> .0175FI) (R<sup>2</sup> .0175ET)

95.5 .045 1.990 3015 3.923E-05 7.649E-04 1.952E 04 3.449E-02 2.909E-02

CAMERA ROLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHO/ACK) TRAR(TO) RETA(TO)

TOP(T) 8094 200 .0519 1.561E-01 1.5613E-01  
SIDE(S) 7272  
BOTTOM(B) 7230

PIC NO	TIME DELTME	M(TO)	M(TO)/MREF	M(.9TO)	M(.9TO)/MREF	M(.902TO)	M(.902TO)/MREF	ST(TO)
M 71621200	10.74	2.668E-03	.0769	3.316E-03	.0956	3.300E-03	.0951	2.209E-03
T 12071200	10.76	2.665E-03	.0768	3.312E-03	.0955	3.296E-03	.0950	2.206E-03
S 49411200	10.76	2.665E-03	.0768	3.312E-03	.0955	3.296E-03	.0950	2.206E-03
T 12081200	11.01	2.528E-03	.0729	3.142E-03	.0906	3.127E-03	.0901	2.093E-03
S 49421200	11.01	2.528E-03	.0729	3.142E-03	.0906	3.127E-03	.0901	2.093E-03
M 71631200	11.01	2.528E-03	.0729	3.142E-03	.0906	3.127E-03	.0901	2.093E-03
T 12091200	12.56	2.411E-03	.0695	2.993E-03	.0864	2.982E-03	.0859	1.995E-03
S 49431200	12.56	2.411E-03	.0695	2.993E-03	.0864	2.982E-03	.0859	1.995E-03
M 71641200	12.59	2.408E-03	.0694	2.993E-03	.0863	2.978E-03	.0858	1.993E-03
T 12101200	12.59	2.408E-03	.0694	2.993E-03	.0863	2.978E-03	.0858	1.993E-03
S 49441200	12.59	2.408E-03	.0694	2.993E-03	.0863	2.978E-03	.0858	1.993E-03
M 71651200	13.54	2.306E-03	.0665	2.866E-03	.0826	2.852E-03	.0822	1.909E-03
T 12111200	13.54	2.306E-03	.0665	2.866E-03	.0826	2.852E-03	.0822	1.909E-03
S 49451200	13.54	2.306E-03	.0665	2.866E-03	.0826	2.852E-03	.0822	1.909E-03
M 71661200	13.57	2.216E-03	.0639	2.754E-03	.0793	2.741E-03	.0790	1.834E-03
T 12121200	13.74	2.214E-03	.0638	2.752E-03	.0793	2.734E-03	.0789	1.832E-03
S 49461200	13.74	2.214E-03	.0638	2.752E-03	.0793	2.734E-03	.0789	1.832E-03
M 71671200	14.79	2.134E-03	.0615	2.652E-03	.0764	2.639E-03	.0761	1.767E-03
T 12131200	14.81	2.132E-03	.0615	2.650E-03	.0764	2.637E-03	.0760	1.765E-03
S 49471200	14.81	2.132E-03	.0615	2.650E-03	.0764	2.637E-03	.0760	1.765E-03
M 71681200	15.47	2.050E-03	.0594	2.561E-03	.0738	2.549E-03	.0734	1.705E-03
T 12141200	15.47	2.050E-03	.0594	2.561E-03	.0738	2.549E-03	.0734	1.705E-03
S 49481200	15.47	2.050E-03	.0594	2.561E-03	.0738	2.549E-03	.0734	1.705E-03
M 71691200	15.89	1.944E-03	.0575	2.474E-03	.0714	2.466E-03	.0711	1.650E-03
T 12151200	15.89	1.944E-03	.0575	2.474E-03	.0714	2.466E-03	.0711	1.650E-03
S 49491200	15.89	1.944E-03	.0575	2.474E-03	.0714	2.466E-03	.0711	1.650E-03
M 71701200	16.22	1.822E-03	.0554	2.401E-03	.0693	2.393E-03	.0690	1.601E-03
T 12161200	16.22	1.822E-03	.0554	2.401E-03	.0693	2.393E-03	.0690	1.601E-03
S 49501200	16.22	1.822E-03	.0554	2.401E-03	.0693	2.393E-03	.0690	1.601E-03

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7/10/73

NASA-RI ORBITER HEATING

AEDC(AROTAC) ARNOLD AFS, TENNESSEE  
VON KARMAN GAS DYNAMICS FACILITY  
50 INCH HYPERSONIC TUNNEL R

4209

GROUP	CONFIG	MODEL	MACH NO	Q(P/SIA)	TO( DEG R)	ALPHA-MODEL	ALPHA-SECTOR	ALPHA-PREBEND	ROLL-MODEL	YAW
111	S	ORBITER R2	7.97	426.8	1309	25.01	4.99	-30.00	-180.00	-0.00
7-INF	P-INF	U-INF	V-INF	RHO-INF	WU-INF	HF/FT	MREF	STREF		
(DEG R)	(PSIA)	(PSIA)	(PSIA)	(SLUGS/FT <sup>3</sup> )	(LBS-SEC/FT <sup>2</sup> )	(FT-1)	(RZ-.0175EI)	(RZ-.0175EI)		
90.5	.045	1.992	3816	3.936E-05	7.688E-08	1.554E 06	3.470E-02	2.908E-02		
CAMERA	ROLL NO	PAINT TEMP (DEG F)	INITIAL TEMP (DEG F)	SQUARE ROOT (RHOXCAK)	T8AR(10)	BFA(10)				
TOP(1)	8094		80	.0519	1.561E-01	1.5813E-01				
SIDE(5)	7272									
WOTLOW(R)	7739									

PIC NO	TIME RELTIME	H(10)	H(10)/HREF	H(-910)	H(-910)/HREF	H(-90210)	H(-90210)/HREF	ST(10)
T 1215(200)	19.30 19.02	1.933E-03	.0557	2.403E-03	.0693	2.391E-03	.0489	1.600E-03
S 4949(200)	19.30 19.02	1.933E-03	.0557	2.403E-03	.0693	2.391E-03	.0489	1.600E-03
T 1214(200)	20.35 19.07	1.879E-03	.0542	2.336E-03	.0673	2.324E-03	.0470	1.556E-03
S 4550(200)	20.35 19.07	1.879E-03	.0542	2.336E-03	.0673	2.324E-03	.0470	1.556E-03
M 7171(200)	20.35 19.07	1.879E-03	.0542	2.336E-03	.0673	2.324E-03	.0470	1.556E-03
M 7171(200)	21.10 20.12	1.830E-03	.0527	2.274E-03	.0655	2.263E-03	.0452	1.514E-03
T 1217(200)	21.10 20.12	1.830E-03	.0527	2.274E-03	.0655	2.263E-03	.0452	1.514E-03
S 4551(200)	21.10 20.12	1.830E-03	.0527	2.274E-03	.0655	2.263E-03	.0452	1.514E-03
T 1218(200)	22.08 21.20	1.743E-03	.0514	2.215E-03	.0634	2.204E-03	.0435	1.475E-03
M 7173(200)	22.08 21.20	1.743E-03	.0514	2.215E-03	.0634	2.204E-03	.0435	1.475E-03
S 4952(200)	22.08 21.20	1.743E-03	.0514	2.215E-03	.0634	2.204E-03	.0435	1.475E-03
T 1219(200)	24.15 22.87	1.716E-03	.0495	2.131E-03	.0615	2.122E-03	.0412	1.420E-03
S 4553(200)	24.15 22.87	1.716E-03	.0495	2.131E-03	.0615	2.122E-03	.0412	1.420E-03
M 7174(200)	24.15 22.87	1.716E-03	.0495	2.131E-03	.0615	2.122E-03	.0412	1.420E-03
T 1221(200)	26.18 24.90	1.645E-03	.0474	2.044E-03	.0589	2.034E-03	.0386	1.361E-03
S 4954(200)	26.18 24.90	1.645E-03	.0474	2.044E-03	.0589	2.034E-03	.0386	1.361E-03
M 7175(200)	26.18 24.90	1.645E-03	.0474	2.044E-03	.0589	2.034E-03	.0386	1.361E-03
T 1221(200)	28.21 26.93	1.542E-03	.0454	1.946E-03	.0566	1.934E-03	.0366	1.309E-03
S 4955(200)	28.21 26.93	1.542E-03	.0454	1.946E-03	.0566	1.934E-03	.0366	1.309E-03
M 7176(200)	28.21 26.93	1.542E-03	.0454	1.946E-03	.0566	1.934E-03	.0366	1.309E-03
T 1222(200)	30.23 28.94	1.525E-03	.0439	1.895E-03	.0546	1.884E-03	.0343	1.262E-03
S 4956(200)	30.23 28.94	1.525E-03	.0439	1.895E-03	.0546	1.884E-03	.0343	1.262E-03
M 7177(200)	30.23 28.94	1.525E-03	.0439	1.895E-03	.0546	1.884E-03	.0343	1.262E-03
T 1223(200)	32.29 31.01	1.474E-03	.0425	1.832E-03	.0528	1.823E-03	.0325	1.219E-03
S 4957(200)	32.29 31.01	1.474E-03	.0425	1.832E-03	.0528	1.823E-03	.0325	1.219E-03
M 7178(200)	32.29 31.01	1.474E-03	.0425	1.832E-03	.0528	1.823E-03	.0325	1.219E-03

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7272  
GP 112  
CWC

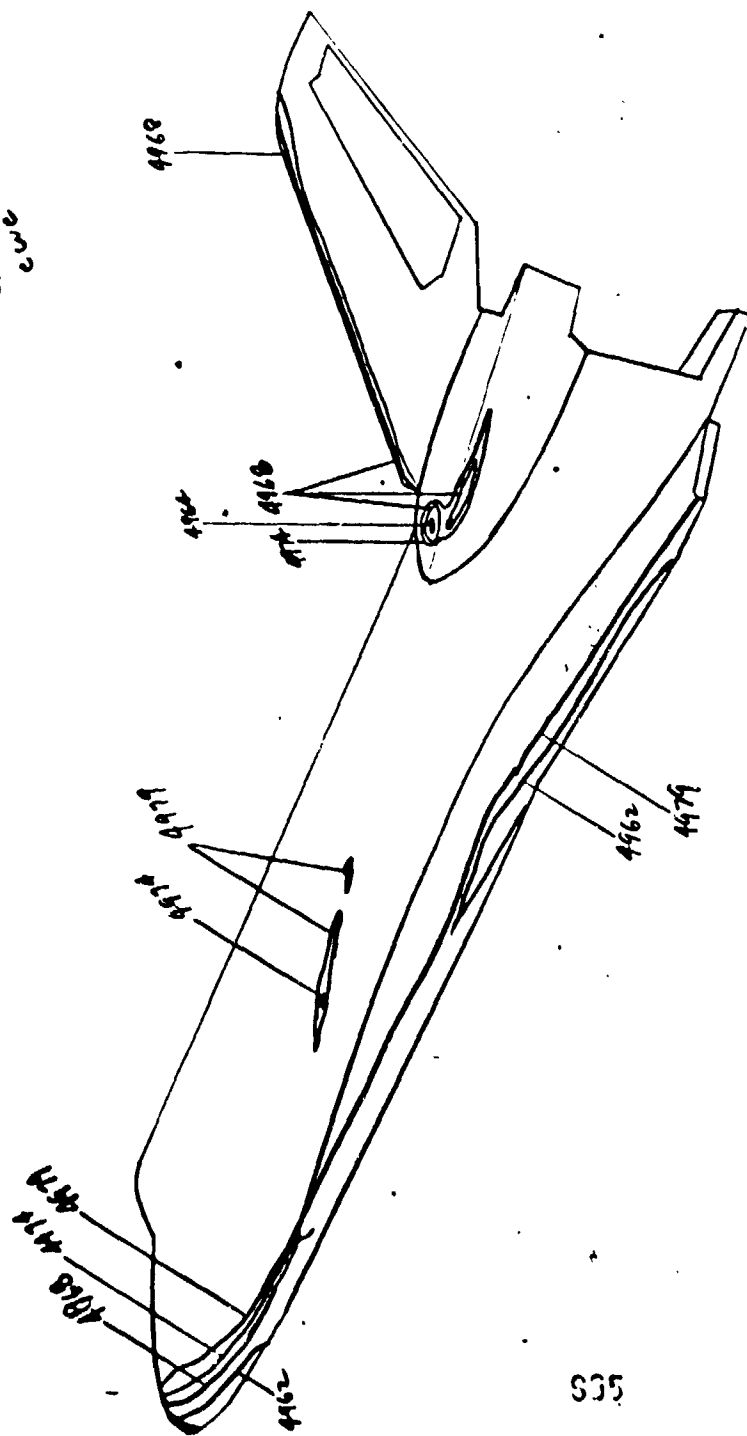


Figure 141



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7/10/73

MASA-RI ORRITTEN PEATING AEDCI(ARINC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL A  
 VA209

GROUP COMF16 MODEL MACH NO PO(PSIA) TO(DEG R) ALPHA-MODEL ALPHA-PREEND ROLL-MODEL YAW  
 112 2 ORRITER S 7.97 424.7 1205 25.00 5.00 -30.00 -180.00 --0.00

T-INF P-INF O-INF V-INF RHO-INF MU-INF RE/FI MREF STREF  
 (DEG R) (PSIA) (FT/SEC) (SLUGS/FT3) (LB-SEC/FT2) (ET-1) (R= .0175EI) (R= .0175EI)

95.2 .045 1.982 3811 7.02PF-05 7.665E-08 1.953E 06 3.460E-02 2.910E-02

CAMERA ROLL NG PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHOXCK) TRAR(TO) BETA(TO)  
 TOP(T) 8094 90 .0519 0 0  
 SLOF(S) 7272  
 MOTCH(R) 7730

PIC NO TIME DELTIME H(TO) M(TO)/MREF H(.9TO) M(.9TO)/MREF H(.902TO) M(.902TO)/MREF ST(TO)

M 7119(200) 1.15 MODEL HAS NOT REACHED CENTERLINE  
 T 1224(200) 1.18 MODEL HAS NOT REACHED CENTERLINE  
 S 4954(200) 1.18 MODEL HAS NOT REACHED CENTERLINE  
 M 7180(200) 2.23 MODEL HAS NOT REACHED CENTERLINE  
 T 1225(200) 2.25 MODEL HAS NOT REACHED CENTERLINE  
 S 4959(200) 2.25 MODEL HAS NOT REACHED CENTERLINE

INJECT TIME = 2.28

M 7181(200) 3.20 DATA NOT YET VALID  
 T 1226(200) 3.23 DATA NOT YET VALID

M 7192(200) 4.38 3.10 4.649E-03 .1355 5.830E-03 .1685 5.802E-03 .1676 3.891E-03  
 T 1227(200) 4.41 3.13 4.670E-03 .1350 5.870E-03 .1678 5.779E-03 .1670 3.877E-03  
 S 4961(200) 4.41 3.13 4.670E-03 .1350 5.870E-03 .1678 5.779E-03 .1670 3.877E-03  
 M 7183(200) 5.46 4.10 4.040E-03 .1167 4.024E-03 .1442 4.999E-03 .1445 3.354E-03  
 T 1228(200) 5.48 4.20 4.024E-03 .1164 4.009E-03 .1447 4.984E-03 .1440 3.343E-03  
 S 4962(200) 5.48 4.20 4.024E-03 .1164 4.009E-03 .1447 4.984E-03 .1440 3.343E-03  
 M 1229(200) 6.53 5.25 3.802E-03 .1041 4.480E-03 .1204 4.458E-03 .1288 2.990E-03  
 T 1184(200) 6.53 5.25 3.802E-03 .1041 4.480E-03 .1204 4.458E-03 .1288 2.990E-03  
 S 4563(200) 6.56 5.20 3.544E-03 .1038 4.480E-03 .1204 4.458E-03 .1288 2.990E-03  
 T 1230(200) 7.61 6.33 3.242E-03 .0948 4.041E-03 .1179 4.061E-03 .1173 2.722E-03  
 S 4964(200) 7.61 6.33 3.242E-03 .0948 4.041E-03 .1179 4.061E-03 .1173 2.722E-03  
 M 7185(200) 8.61 7.41 3.024E-03 .0877 3.773E-03 .1179 4.061E-03 .1173 2.722E-03  
 T 1231(200) 8.68 7.41 3.024E-03 .0877 3.773E-03 .1179 4.061E-03 .1173 2.722E-03  
 S 4965(200) 8.71 7.43 3.024E-03 .0875 3.767E-03 .1179 4.061E-03 .1173 2.722E-03  
 T 1232(200) 9.16 8.40 2.845E-03 .0819 3.525E-03 .1179 4.061E-03 .1173 2.722E-03  
 S 4966(200) 9.16 8.40 2.845E-03 .0819 3.525E-03 .1179 4.061E-03 .1173 2.722E-03  
 M 7187(200) 9.76 8.40 2.835E-03 .0819 3.525E-03 .1179 4.061E-03 .1173 2.722E-03

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7/10/73

NASA-R1 ORBITER HEATING  
VA289  
AEOC (ARO, INC.) ARNOLD AFS, TENNESSEE  
VON KARMAN GAS DYNAMICS FACILITY  
50 INCH HYPERSONIC TUNNEL A

GROUP CONFIG MODEL MACH NO PO (PSIA) TO (DEG R) ALPHA-MODEL ALPHA-SECTION ALPHA-PREBEND ROLL-MODEL YAW  
112 2 ORBITER S 7.97 425.3 1305 25.00 5.00 -30.00 -150.00 --0.00  
T-INF P-INF Q-INF V-INF W-INF MU-INF PE/FT MREF STREF  
(DEG R) (PSIA) (FT/SEC) (SLUGS/FT<sup>3</sup>) (LH-SEC/FT<sup>2</sup>) (FT-1) (R= .0175EI) (R= .0175EI)  
95.2 .045 1.945 3810 3.024F-05 7.664F-08 1.956E 06 3.442E-02 2.907E-02

CAMERA ROLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHOXCAK) T9AH(TO) BETA(TO)  
TOP(T) 8094  
SIDE(S) 7272  
BOTTOM(B) 7139  
200 80 .0519 1.569E-01 1.5910E-01

QIC NO	TIME DELTIME	M(TO)/MREF	M(-9TO)	M(.9TO)/MREF	M(-902TO)	M(.902TO)/MREF	ST(TO)
T 1233(200)	10.84	9.54	2.671E-03	.0772	3.321E-03	.0960	2.216E-03
S 4567(200)	10.84	9.54	2.671E-03	.0772	3.321E-03	.0960	2.216E-03
M 7145(200)	10.84	9.54	2.671E-03	.0772	3.321E-03	.0960	2.216E-03
T 1234(200)	11.51	10.64	2.542E-03	.0731	3.149E-03	.0909	2.100E-03
S 4568(200)	11.51	10.64	2.542E-03	.0731	3.149E-03	.0909	2.100E-03
M 7146(200)	11.51	10.64	2.542E-03	.0731	3.149E-03	.0909	2.100E-03
T 1235(200)	12.59	11.71	2.413E-03	.0697	3.000E-03	.0867	2.000E-03
S 4569(200)	12.59	11.71	2.413E-03	.0697	3.000E-03	.0867	2.000E-03
M 7147(200)	12.59	11.71	2.413E-03	.0697	3.000E-03	.0867	2.000E-03
T 1236(200)	14.07	12.79	2.349E-03	.0667	2.871E-03	.0829	1.914E-03
S 4570(200)	14.07	12.79	2.349E-03	.0667	2.871E-03	.0829	1.914E-03
M 7148(200)	14.07	12.79	2.349E-03	.0667	2.871E-03	.0829	1.914E-03
T 1237(200)	15.14	13.86	2.214E-03	.0641	2.754E-03	.0797	1.839E-03
S 4571(200)	15.14	13.86	2.214E-03	.0641	2.754E-03	.0797	1.839E-03
M 7149(200)	15.14	13.86	2.214E-03	.0641	2.754E-03	.0797	1.839E-03
T 1240(200)	16.22	14.94	2.146E-03	.0617	2.654E-03	.0767	1.772E-03
S 4572(200)	16.22	14.94	2.146E-03	.0617	2.654E-03	.0767	1.772E-03
M 7150(200)	16.22	14.94	2.146E-03	.0617	2.654E-03	.0767	1.772E-03
T 1241(200)	17.29	16.02	2.043E-03	.0594	2.564E-03	.0741	1.711E-03
S 4573(200)	17.29	16.02	2.043E-03	.0594	2.564E-03	.0741	1.711E-03
M 7151(200)	17.29	16.02	2.043E-03	.0594	2.564E-03	.0741	1.711E-03
T 1242(200)	18.37	17.09	1.947E-03	.0577	2.471E-03	.0717	1.655E-03
S 4574(200)	18.37	17.09	1.947E-03	.0577	2.471E-03	.0717	1.655E-03
M 7152(200)	18.37	17.09	1.947E-03	.0577	2.471E-03	.0717	1.655E-03
T 1243(200)	19.45	18.17	1.831E-03	.0559	2.409E-03	.0695	1.605E-03
S 4575(200)	19.45	18.17	1.831E-03	.0559	2.409E-03	.0695	1.605E-03
M 7153(200)	19.45	18.17	1.831E-03	.0559	2.409E-03	.0695	1.605E-03

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AEDC(ARO,INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL R

44A-RI HRRITER HEATING  
 VA289

GROUP CONFIE MODEL MACH NO P0(PSIA) T0(OFG F) ALPHA-MODEL ALPH FCTOR ALPHA-PREHEND ROLL-MODEL YAW  
 112 2 ORBITER S 7.97 425.7 1305 25.00 5 -30.00 -180.00 --.00

T-INF P-INF Q-INF V-INF MU-INF HREF PF/FT STREF  
 (DGC P) (PSIA) (FT/SEC) (SLUGS/FT3) (LB-SEC/FT2) (EI-1) (R2-0175ET)

95.2 .085 1.987 3810 3.938E-05 7.664E-04 1.958E 06 3.444E-02 2.908E-02

CAMFRA ROLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHOXCK) TBAR(ITO) BETA(ITO)

TOP(IT) 8094  
 S(CFIS) 7272  
 MOTCH(B) 7739

1.569E-01 1.5910E-01

PIC NO	TIME DELTIME	H(ITO)	H(ITO)/HREF	H(.910)	M(.910)/HREF	M(.902TO)	M(.902TO)/HREF	ST(ITO)
1 1242(200)	20.52	1.842E-03	.0543	2.341E-03	.0576	2.329E-03	.0673	1.568E-03
5 4976(200)	20.52	1.842E-03	.0543	2.341E-03	.0576	2.329E-03	.0673	1.568E-03
M 7197(200)	20.52	1.842E-03	.0543	2.341E-03	.0576	2.329E-03	.0673	1.568E-03
1 1243(200)	21.60	1.842E-03	.0529	2.274E-03	.0548	2.267E-03	.0654	1.518E-03
5 4977(200)	21.60	1.842E-03	.0529	2.274E-03	.0548	2.267E-03	.0654	1.518E-03
M 7198(200)	21.60	1.842E-03	.0529	2.274E-03	.0548	2.267E-03	.0654	1.518E-03
1 1244(200)	22.65	1.744E-03	.0515	2.220E-03	.0541	2.210E-03	.0638	1.480E-03
5 4978(200)	22.65	1.744E-03	.0515	2.220E-03	.0541	2.209E-03	.0638	1.479E-03
M 7201(200)	22.65	1.744E-03	.0515	2.220E-03	.0541	2.209E-03	.0638	1.479E-03
1 1245(200)	24.38	1.714E-03	.0496	2.136E-03	.0517	2.126E-03	.0614	1.423E-03
5 4979(200)	24.38	1.714E-03	.0496	2.136E-03	.0517	2.126E-03	.0614	1.423E-03
M 7200(200)	24.38	1.714E-03	.0496	2.136E-03	.0517	2.126E-03	.0614	1.423E-03
1 1246(200)	25.41	1.647E-03	.0475	2.044E-03	.0491	2.038E-03	.0588	1.364E-03
5 4980(200)	25.41	1.647E-03	.0475	2.044E-03	.0491	2.038E-03	.0588	1.364E-03
M 7201(200)	25.41	1.647E-03	.0475	2.044E-03	.0491	2.038E-03	.0588	1.364E-03
MODEL HAS LEFT CATERLINE								
1 1247(200)	26.43	1.545E-03	.0457	1.970E-03	.0469	1.961E-03	.0566	1.317E-03
5 4981(200)	26.43	1.545E-03	.0457	1.970E-03	.0469	1.961E-03	.0566	1.317E-03
M 7202(200)	26.43	1.545E-03	.0457	1.970E-03	.0469	1.961E-03	.0566	1.317E-03
1 1248(200)	28.46	1.528E-03	.0441	1.900E-03	.0448	1.891E-03	.0546	1.265E-03
5 4982(200)	28.46	1.528E-03	.0441	1.900E-03	.0448	1.891E-03	.0546	1.265E-03
M 7203(200)	28.46	1.528E-03	.0441	1.900E-03	.0448	1.891E-03	.0546	1.265E-03

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Group 113  
7739

4525  
 $\alpha = 25^\circ$   
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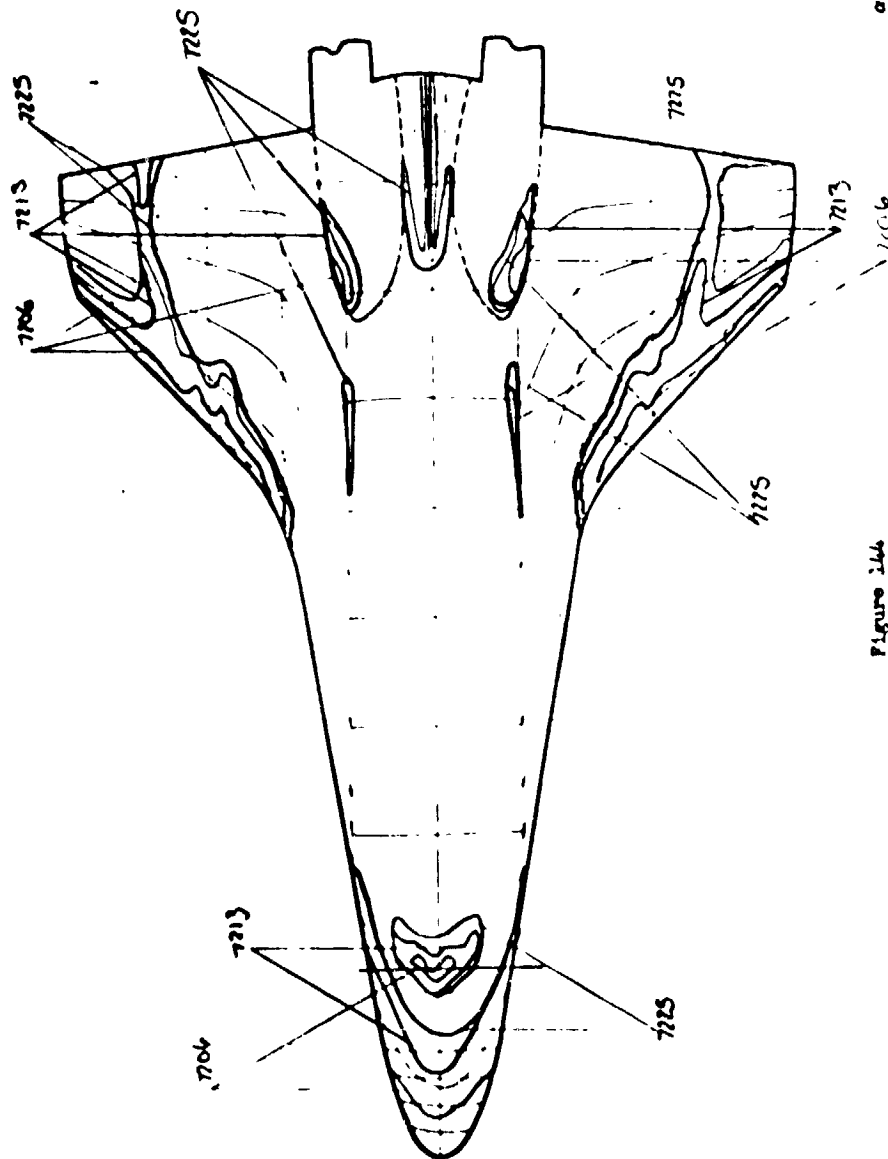


Figure 144

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7/10/73

NASA-21 CRITTER PEATING

W2240

AECIARO, INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL A

GROUP	CONFIG	MODEL	MACH NO	PO(PISA)	TO(DEC R)	ALPHA-MODEL	ALPHA-SECTION	ALPHA-PREBEND	ROLL-MODEL	YAW
111	2	CRITTER S	7.97	425.0	1305	24.99	5.01	-30.00	-100.00	-0.00
T-1AF	P-1AF	Q-1AF	RMO-1AF	MU-1AF	RF/FT	MREF	STREF			
DEG B1	(PISA)	(FT/SEC)	(SLUGS/FT)	(FT-1)	(FT-1)	(R=)	(R=)			
95.2	0.45	1.003	3811	1.000E-05	1.954E-06	3.441E-02	2.909E-02			
CAPPA	ROLL NO	PAINT TEMP (DEG F)	INITIAL TEMP (DEG F)	SQUARE ROOT (RMUXCAX)	TRAR(TO)	BETA(TO)				
TOP(T)	8094									
SIRF(S)	7272									
MO(TCM(R)	7239									

PIC NO	TIME DELTIME	M(TO)	M(TO)/MREF	M(-910)	M(-910)/MREF	M(-902TO)	M(-902TO)/MREF	ST(TO)
T 1254(113)	10.54	9.54	0.171	7.169E-04	0.207	7.134E-04	0.206	4.922E-04
S 4992(113)	10.54	9.54	0.171	7.169E-04	0.207	7.134E-04	0.206	4.922E-04
M 7212(113)	10.54	9.54	0.171	7.169E-04	0.207	7.134E-04	0.206	4.922E-04
T 1759(113)	11.51	10.54	0.162	6.797E-04	0.196	6.763E-04	0.195	4.688E-04
S 4993(113)	11.51	10.54	0.162	6.797E-04	0.196	6.763E-04	0.195	4.688E-04
M 7214(113)	11.51	10.54	0.162	6.797E-04	0.196	6.763E-04	0.195	4.688E-04
T 1760(113)	12.59	11.71	0.154	6.477E-04	0.187	6.445E-04	0.186	4.445E-04
S 4994(113)	12.59	11.71	0.154	6.477E-04	0.187	6.445E-04	0.186	4.445E-04
M 7215(113)	12.59	11.71	0.154	6.477E-04	0.187	6.445E-04	0.186	4.445E-04
T 1761(113)	14.04	12.74	0.147	6.204E-04	0.179	6.174E-04	0.178	4.253E-04
S 4995(113)	14.04	12.74	0.147	6.204E-04	0.179	6.174E-04	0.178	4.253E-04
M 7216(113)	14.04	12.74	0.147	6.204E-04	0.179	6.174E-04	0.178	4.253E-04
T 1762(113)	15.14	13.04	0.142	5.953E-04	0.172	5.924E-04	0.171	4.084E-04
S 4996(113)	15.14	13.04	0.142	5.953E-04	0.172	5.924E-04	0.171	4.084E-04
M 7217(113)	15.14	13.04	0.142	5.953E-04	0.172	5.924E-04	0.171	4.084E-04
T 1763(113)	16.22	14.04	0.136	5.734E-04	0.166	5.704E-04	0.165	3.936E-04
S 4997(113)	16.22	14.04	0.136	5.734E-04	0.166	5.704E-04	0.165	3.936E-04
M 7218(113)	16.22	14.04	0.136	5.734E-04	0.166	5.704E-04	0.165	3.936E-04
T 1764(113)	17.29	16.02	0.132	5.534E-04	0.160	5.511E-04	0.159	3.800E-04
S 4998(113)	17.29	16.02	0.132	5.534E-04	0.160	5.511E-04	0.159	3.800E-04
M 7219(113)	17.29	16.02	0.132	5.534E-04	0.160	5.511E-04	0.159	3.800E-04
T 1765(113)	18.37	17.09	0.127	5.361E-04	0.155	5.335E-04	0.154	3.678E-04
S 4999(113)	18.37	17.09	0.127	5.361E-04	0.155	5.335E-04	0.154	3.678E-04
M 7220(113)	18.37	17.09	0.127	5.361E-04	0.155	5.335E-04	0.154	3.678E-04
T 1766(113)	19.45	18.17	0.124	5.200E-04	0.150	5.175E-04	0.149	3.567E-04
S 5000(113)	19.45	18.17	0.124	5.200E-04	0.150	5.175E-04	0.149	3.567E-04
M 7221(113)	19.45	18.17	0.124	5.200E-04	0.150	5.175E-04	0.149	3.567E-04

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7/10/73

NASA-RI ORBITER HEATING

VAP29

AEDC(ARN-INC.) ARNOLD AFS, TENNESSEE  
VON KARMAN GAS DYNAMICS FACILITY  
50 INCH HYPERSONIC TUNNEL R

GROUP CONFIG MODEL MACH NO POI(PSIA) TO(DEG R) ALPHA-MODEL ALPHA-SECTION ALPHA-PREHEND ROLL-MODEL YAW  
113 2 CHESTER S 7.97 425.4 1305 24.99 5.01 -30.00 -180.00 -0.00

T-INF P-INF Q-INF V-INF W-INF MU-INF RF/FT MREF STREF  
(DEG R) (PSIA) (FI/SEC) (SLUGS/FI3) (LB-SEC/FI2) (FI-1) (R=,0175FI) (R=,0175FI)  
95.2 .045 1.9MS 3811 3.974E-05 7.656E-08 1.556E 06 3.443E-02 2.907E-02

CAMERA ROLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RH0XCHK) T8AR(TO) BETA(TO)  
TOP(T) 8094  
SIDE(S) 7272 113 .0475 4.189E-02 3.8424E-02  
BOTTOM(B) 7739

PIC NO	TIME DELT	H(TO)	H(TO)/HREF	H(.910)	H(.910)/HREF	H(.92TO)	H(.92TO)/HREF	ST(TO)
T 1267(113)	20.52	19.24	4.160E-04	5.053E-04	5.028E-04	5.028E-04	5.028E-04	3.465E-04
S 5001(113)	20.52	19.24	4.160E-04	5.053E-04	5.028E-04	5.028E-04	5.028E-04	3.465E-04
M 7222(113)	20.52	19.24	4.160E-04	5.053E-04	5.028E-04	5.028E-04	5.028E-04	3.465E-04
T 1268(113)	21.60	20.32	4.049E-04	4.917E-04	4.893E-04	4.893E-04	4.893E-04	3.372E-04
S 5002(113)	21.60	20.32	4.049E-04	4.917E-04	4.893E-04	4.893E-04	4.893E-04	3.372E-04
M 7223(113)	21.60	20.32	4.049E-04	4.917E-04	4.893E-04	4.893E-04	4.893E-04	3.372E-04
T 1269(113)	22.68	21.40	3.946E-04	4.792E-04	4.768E-04	4.768E-04	4.768E-04	3.286E-04
S 5003(113)	22.68	21.40	3.946E-04	4.792E-04	4.768E-04	4.768E-04	4.768E-04	3.286E-04
M 7224(113)	22.68	21.40	3.946E-04	4.792E-04	4.768E-04	4.768E-04	4.768E-04	3.286E-04
T 1270(113)	24.33	23.05	3.802E-04	4.617E-04	4.594E-04	4.594E-04	4.594E-04	3.164E-04
S 5004(113)	24.33	23.05	3.802E-04	4.617E-04	4.594E-04	4.594E-04	4.594E-04	3.164E-04
M 7225(113)	24.33	23.05	3.802E-04	4.617E-04	4.594E-04	4.594E-04	4.594E-04	3.164E-04
T 1271(113)	26.38	25.10	3.643E-04	4.424E-04	4.402E-04	4.402E-04	4.402E-04	3.032E-04
S 5005(113)	26.38	25.10	3.643E-04	4.424E-04	4.402E-04	4.402E-04	4.402E-04	3.032E-04
M 7226(113)	26.38	25.10	3.643E-04	4.424E-04	4.402E-04	4.402E-04	4.402E-04	3.032E-04
T 1272(113)	28.41	27.13	3.504E-04	4.256E-04	4.235E-04	4.235E-04	4.235E-04	2.917E-04
S 5006(113)	28.41	27.13	3.504E-04	4.256E-04	4.235E-04	4.235E-04	4.235E-04	2.917E-04
M 7227(113)	28.41	27.13	3.504E-04	4.256E-04	4.235E-04	4.235E-04	4.235E-04	2.917E-04
T 1273(113)	30.46	29.18	3.379E-04	4.103E-04	4.083E-04	4.083E-04	4.083E-04	2.813E-04
S 5007(113)	30.46	29.18	3.379E-04	4.103E-04	4.083E-04	4.083E-04	4.083E-04	2.813E-04
M 7228(113)	30.46	29.18	3.379E-04	4.103E-04	4.083E-04	4.083E-04	4.083E-04	2.813E-04

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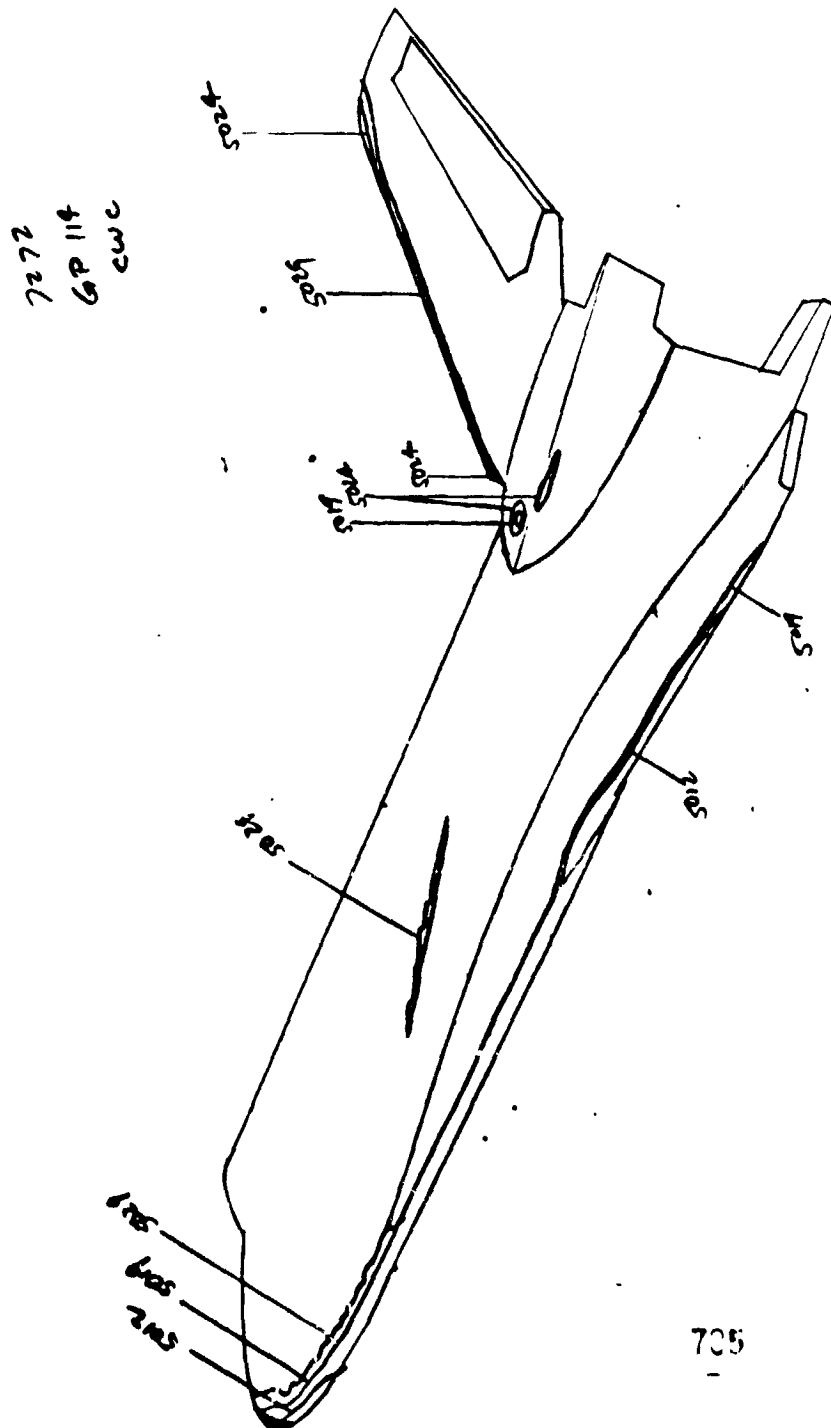


Figure 145





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7/10/73

NASA-RI ORBITER HEATING

AEDC(ARO,INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL R

VA299

GROUP	CONFID	MODEL	MACH NO	PO(PSTA)	TO(DEG R)	ALPHA-MODEL	ALPHA-SECTOR	ALPHA-PREEND	ROLL-MODEL	YAW
114	6	ORBITER R3	7.97	424.7	1307	25.00	5.00	-30.00	-180.00	-0.00
T-INF	P-INF	O-INF	V-INF	RHO-INF	MU-INF	RE/FT	MREF	STREF		
(DEG R)	(PSTA)	(FT/SEC)	(SLUGS/FT <sup>3</sup> )	(LBS-SEC/FT <sup>2</sup> )	(FT-1)		(R= .0175F1)	(R= .0175F1)		
95.3	.045	1.982	3813	3.922E-05	7.676E-04	1.948E 04	3.441E-02	2.912E-02		
CAMERA	ROLL NO	PAINT IFMP	(DEG F)	INITIAL TEMP	(DEG F)	SQUARE ROOT	(RHOXCK)	TBAR(TO)	BETA(TO)	
TOP(T)	7830									
SIDE(S)	7272		250		81		.0535		0	0
NOTCH(R)	7739									

PIC NO	TIME DELTIME	HITO	HITO/HREF	M(.9TO)	HREF M(.902TO)	M(.902TO)/HREF	ST(TO)
T 1300(250)	1.15	MODEL HAS NOT REACHED CENTERLINE					
M 7229(250)	1.15	MODEL HAS NOT REACHED CENTERLINE					
S 5008(250)	1.18	MODEL HAS NOT REACHED CENTERLINE					
S 5009(250)	2.23	MODEL HAS NOT REACHED CENTERLINE					
M 7230(250)	2.23	MODEL HAS NOT REACHED CENTERLINE					
T 1301(250)	2.25	MODEL HAS NOT REACHED CENTERLINE					
INJECT TIME =	2.28						
T 1302(250)	3.30	DATA NOT YET VALID					
S 5010(250)	3.30	DATA NOT YET VALID					
M 7231(250)	3.30	DATA NOT YET VALID					
T 1303(250)	4.28	7.236E-03	.2090	9.151E-03	.2643	9.103E-03	.2629
S 5011(250)	4.28	7.236E-03	.2090	9.151E-03	.2643	9.103E-03	.2629
M 7232(250)	4.28	7.236E-03	.2090	9.151E-03	.2643	9.103E-03	.2629
T 1304(250)	5.46	6.234E-03	.1901	7.885E-03	.2277	7.843E-03	.2265
S 5012(250)	5.46	6.234E-03	.1801	7.885E-03	.2277	7.843E-03	.2265
M 7233(250)	5.46	6.234E-03	.1801	7.885E-03	.2277	7.843E-03	.2265
T 1305(250)	6.53	5.559E-03	.1604	7.031E-03	.2031	6.994E-03	.2020
S 5013(250)	6.53	5.559E-03	.1604	7.031E-03	.2031	6.994E-03	.2020
M 7234(250)	6.53	5.559E-03	.1606	7.031E-03	.2031	6.994E-03	.2020
T 1306(250)	7.58	5.075E-03	.1465	6.406E-03	.1850	6.371E-03	.1840
S 5014(250)	7.58	5.075E-03	.1463	6.406E-03	.1850	6.371E-03	.1840
M 7235(250)	7.58	5.075E-03	.1463	6.406E-03	.1850	6.371E-03	.1840
T 1307(250)	8.66	4.640E-03	.1354	5.922E-03	.1713	5.900E-03	.1704
S 5015(250)	8.66	4.640E-03	.1354	5.922E-03	.1713	5.900E-03	.1704
M 7236(250)	8.66	4.640E-03	.1354	5.922E-03	.1713	5.900E-03	.1704
T 1308(250)	9.74	4.342E-03	.1265	5.522E-03	.1600	5.512E-03	.1592
S 5016(250)	9.74	4.342E-03	.1265	5.522E-03	.1600	5.512E-03	.1592
M 7237(250)	9.74	4.342E-03	.1265	5.522E-03	.1600	5.512E-03	.1592

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7/10/73

NASA-PI ORBITER HEATING

AEDC(AR-10) ARNOLD AFS, TENNESSEE

VON KARMAN GAS DYNAMICS FACILITY

50 INCH HYPERSONIC TUNNEL R

VA289

GROUP CONFIG MODEL MACH NO PO(PSIA) I(10 DEG R) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREBEND ROLL-MODEL YAW  
114 6 CORRITER R3 7.97 425.4 1306 25.00 5.00 -30.00 -180.00 -.00

T-INF P-INF Q-INF V-INF MU-INF RMO-INF MU-INF RE/FT MREF STREF  
(DEG R) (PSIA) (FT/SEC) (SLUGS/FT<sup>3</sup>) (LB-SEC/FT<sup>2</sup>) (FT-1) (RZ, 0.175 FT)

95.3 .045 1.995 3813 3.929E-05 7.675E-08 1.952E 04 3.443E-02 2.910E-02

CAMERA ROLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHOXCK) TBAR(10) BETA(10)

TOP(T) 7830 250 81 .0535 2.208E-01 2.3918E-01

510F(S) 7272

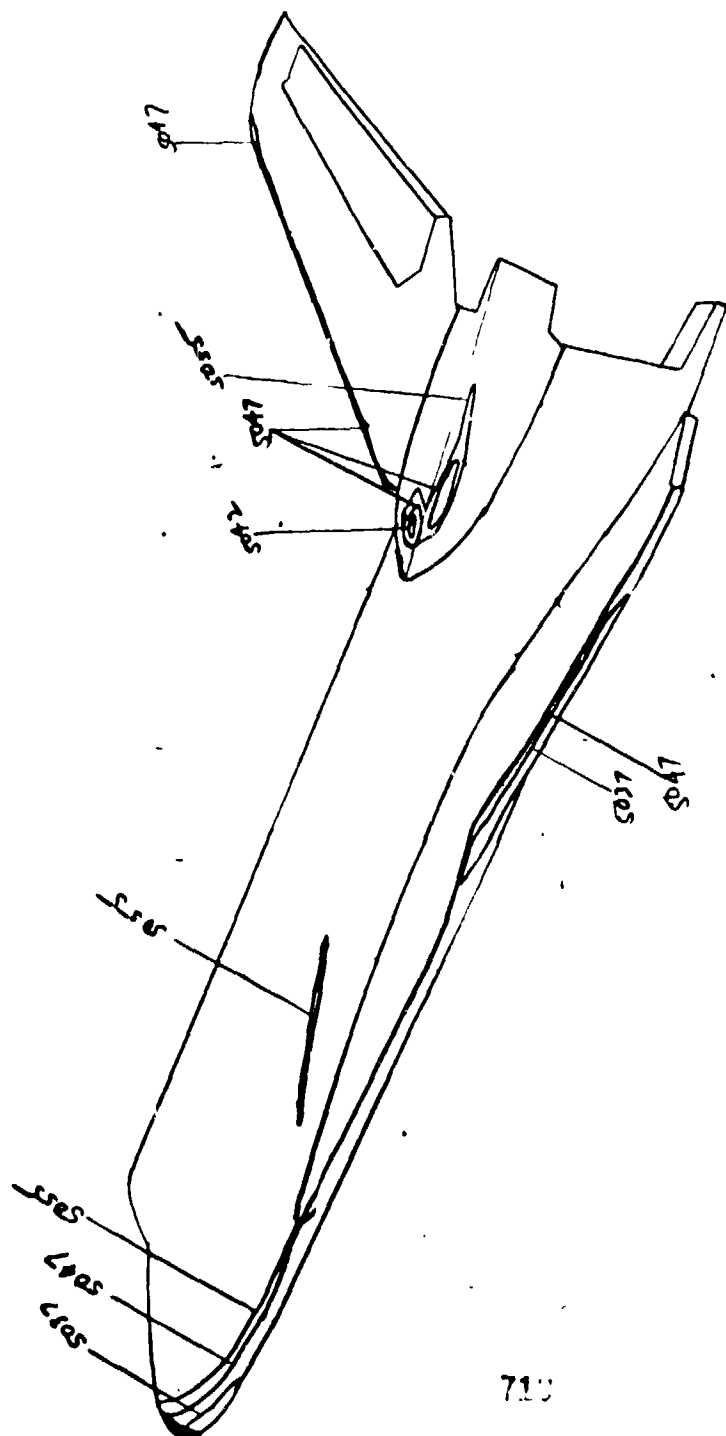
WOTCH(R) 7139

PIC NO	TIME DELTIME	H(10)	H(10)/MREF	H(.970)	H(.970)/MREF	H(.90210)	H(.90210)/MREF	ST(10)
T 1209(250)	10.81	9.53	4.127E-03	5.220E-03	.1507	5.192E-03	.1499	3.415E-03
S 5017(250)	10.81	9.53	4.127E-03	5.220E-03	.1507	5.192E-03	.1499	3.415E-03
M 7234(250)	10.81	9.53	4.127E-03	5.220E-03	.1507	5.192E-03	.1499	3.415E-03
T 1310(250)	11.29	10.61	3.912E-03	4.948E-03	.1429	4.921E-03	.1421	3.237E-03
S 5014(250)	11.29	10.61	3.912E-03	4.948E-03	.1429	4.921E-03	.1421	3.237E-03
M 7239(250)	11.29	10.61	3.912E-03	4.948E-03	.1429	4.921E-03	.1421	3.237E-03
T 1311(250)	12.54	11.64	3.732E-03	4.719E-03	.1342	4.694E-03	.1355	3.085E-03
S 5013(250)	12.54	11.64	3.732E-03	4.719E-03	.1342	4.694E-03	.1355	3.085E-03
M 7240(250)	12.54	11.64	3.732E-03	4.719E-03	.1342	4.694E-03	.1355	3.085E-03
T 1312(250)	14.02	12.74	3.570E-03	4.516E-03	.1361	4.487E-03	.1297	2.950E-03
S 5020(250)	14.04	12.74	3.570E-03	4.516E-03	.1361	4.487E-03	.1297	2.950E-03
M 7242(250)	15.09	13.81	3.429E-03	4.332E-03	.1251	4.309E-03	.1244	2.833E-03
T 1313(250)	15.12	13.84	3.429E-03	4.332E-03	.1251	4.309E-03	.1244	2.833E-03
S 5021(250)	15.12	13.84	3.429E-03	4.332E-03	.1251	4.309E-03	.1244	2.833E-03
M 7243(250)	16.17	14.89	3.322E-03	4.177E-03	.1206	4.154E-03	.1199	2.731E-03
T 1314(250)	16.17	14.89	3.322E-03	4.177E-03	.1206	4.154E-03	.1199	2.731E-03
S 5022(250)	16.17	14.89	3.322E-03	4.177E-03	.1206	4.154E-03	.1199	2.731E-03
M 7244(250)	17.22	15.94	3.192E-03	4.036E-03	.1165	4.015E-03	.1159	2.639E-03
T 1315(250)	17.22	15.94	3.192E-03	4.036E-03	.1165	4.015E-03	.1159	2.639E-03
S 5023(250)	17.24	15.97	3.192E-03	4.036E-03	.1165	4.015E-03	.1159	2.639E-03
M 7245(250)	17.24	15.97	3.192E-03	4.036E-03	.1165	4.015E-03	.1159	2.639E-03
T 1316(250)	18.30	17.02	3.045E-03	3.907E-03	.1128	3.886E-03	.1122	2.554E-03
S 5024(250)	18.32	17.04	3.045E-03	3.907E-03	.1128	3.886E-03	.1122	2.554E-03
M 7246(250)	19.37	18.09	2.946E-03	3.789E-03	.1093	3.769E-03	.1088	2.476E-03
T 1317(250)	19.37	18.09	2.946E-03	3.789E-03	.1093	3.769E-03	.1088	2.476E-03
S 5025(250)	19.37	18.09	2.946E-03	3.789E-03	.1093	3.769E-03	.1088	2.476E-03
M 7247(250)	19.37	18.09	2.946E-03	3.789E-03	.1093	3.769E-03	.1088	2.476E-03

447

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**Figure 147**

7930  
GP 115  
CWC

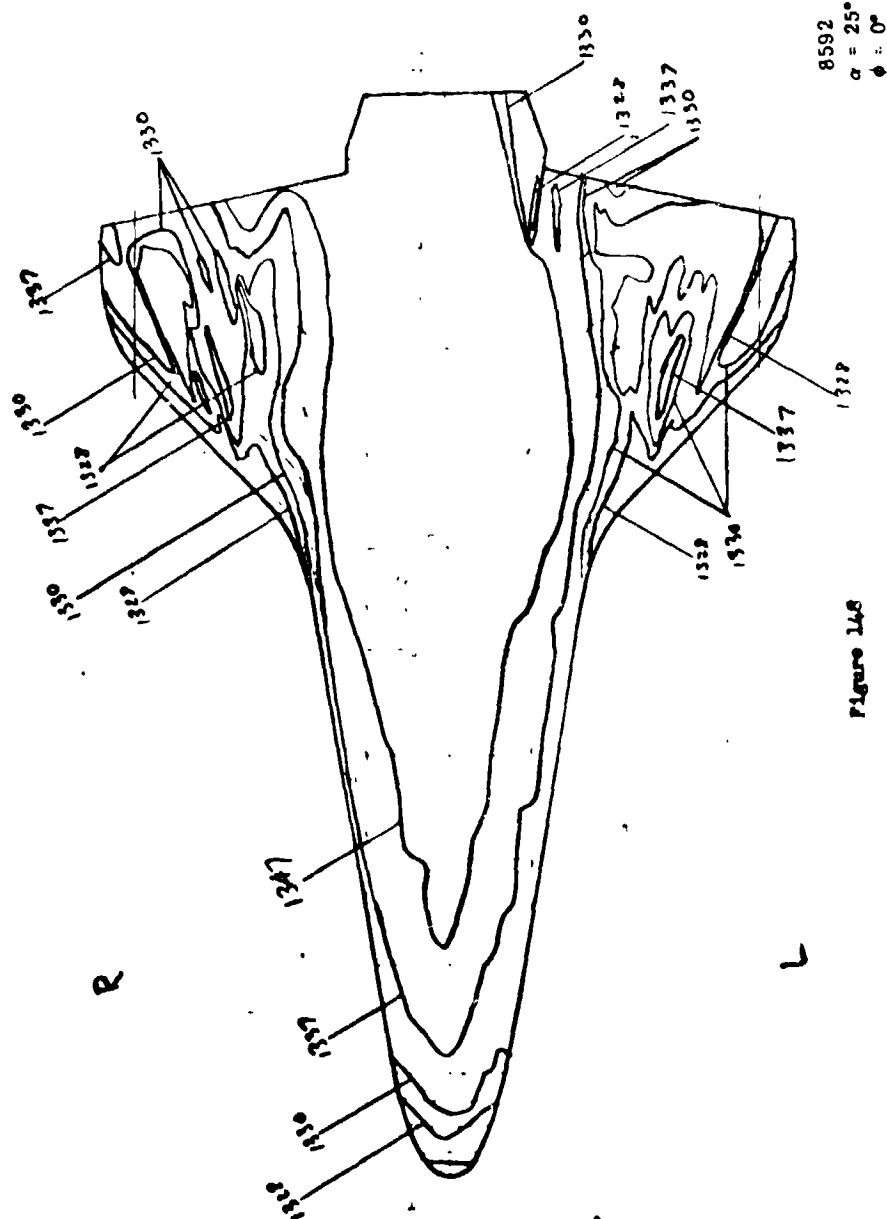
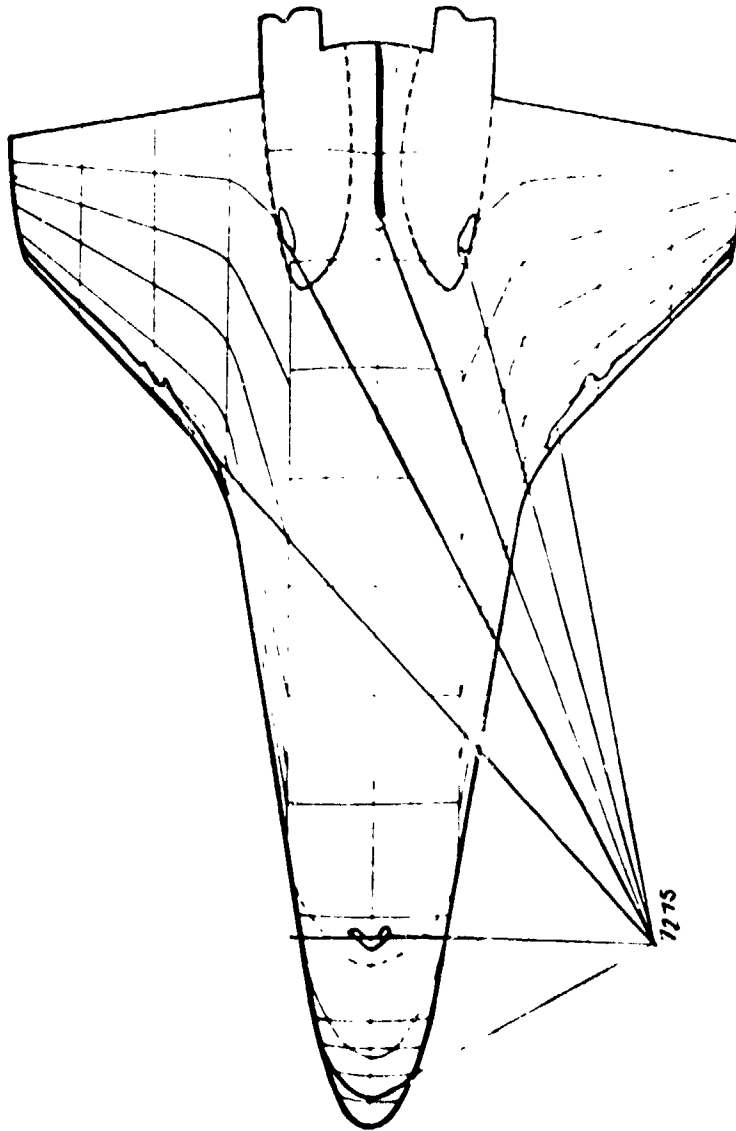


Figure 148

Group 115  
7739  
NOV



4525  
 $\alpha = 25^\circ$   
 $\phi = 0^\circ$

Figure 149

712

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7/10/73

NASA-BI ORBITER HEATING

AEC(ARO-INC.) ARNOLD AFS, TENNESSEE  
 VOM KARMAN GAS DYNAMICS FACILITY  
 50 1" X HYPERSONIC TUNNEL W

62249

GROUP	CONFIG	MODEL	MACH NO	W(PSIA)	TO( DEG R)	ALPHA-MODEL	ALPHA-SECTION	ALPHA-PREHEND	ROLL-MODEL	YAW
115	4	ORBITER F1	7.97	423.7	1309	24.99	5.01	-30.00	-180.00	-0.00
T-INF	-INF	O-INF	V-INF	RHO-INF	W-INF	DE/FT	MREF	SIREF		
(DEG R)	(PSIA)	(PSIA)	(FT/SEC)	(SLUGS/FT3)	(LP-SEC/FT2)	(FT-1)	(R= .0175FT)	(H= .0175FT)		
95.5	.044	1.977	3014	3.007E-05	7.60HF-04	1.940E 06	3.447E-02	2.919E-02		
CAMERA	ROLL NO	PAINT TEMP (DEG F)	INITIAL TEMP (DEG F)	SQUARE ROOT (RHO/ACK)	TRAR(TO)	BETA(TO)				
TOP(T)	7630									
SIDE(S)	7272	225	A0	.052A						
MOTTCM(R)	7139									

PTC NO	TIME	DELTIME	M(TO)	M(TO)/MREF	M(.910)	M(.9010)/MREF	M(.90210)	M(.90210)/MREF	ST(TO)
T 1325(1225)	1.15								
S 5033(1225)	1.15								
M 7254(1225)	1.18								
S 5034(1225)	2.25								
M 7255(1225)	2.25								
INJECT TIME =	2.28								
T 1324(1225)	2.28								
A 7254(1225)	3.20								
T 1327(1225)	3.23								
S 5034(1225)	3.23								
T 1328(1225)	4.28	3.10							
M 7257(1225)	4.28	3.10							
S 5036(1225)	4.41	3.13							
T 1329(1225)	5.46	4.18							
S 5037(1225)	5.46	4.18							
M 7258(1225)	5.46	4.18							
T 1330(1225)	6.53	5.26							
S 5038(1225)	6.53	5.26							
M 7259(1225)	6.53	5.26							
T 1331(1225)	7.61	6.33							
S 5039(1225)	7.61	6.33							
M 7260(1225)	7.61	6.33							
T 1332(1225)	8.68	7.41							
S 5040(1225)	8.68	7.41							
M 7261(1225)	8.68	7.41							
T 1333(1225)	9.74	8.44							
S 5041(1225)	9.74	8.44							
M 7262(1225)	9.74	8.44							

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7/10/73

NACA-DI ORBITER HEATING

AEDC(ARO,INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL A

VA289

GROUP	CONFID	MODEL	WALL NO	W0(PSTIA)	T0(IDEGR)	ALPHA-MODEL	ALPHA-SECTION	ALPHA-PREHEND	ROLL-MODEL	YAW
115	4	CHRTFR R1	7.97	424.6	1309	24.99	5.01	-30.00	-180.00	-0.00
T-1NF	P-1NF	Q-1NF	V-1NF	RHO-1NF	WU-1NF	HF/FT	HREF	SIREF		
(DEGM)	(PSTIA)	(PSTIA)	(FT/SEC)	(SLUGS/FT <sup>3</sup> )	(LBS/SEC/FT <sup>2</sup> )	(FT-1)	(R=0.175F1)	(R=0.175F1)		
94.4	0.65	1.002	3014	3.015E-05	7.680E-08	1.943E 06	3.441E-02	2.915E-02		
CAMFER	ROLL NO	PAINT TEMP (DEG F)	INITIAL TEMP (DEG F)	SQUARE ROOT (RHO/CAPK)	TRANSITO	BETA(10)				
TOP(1)	7830									
SIC(1)	7272	225	80	0.0524	1.007E-01	1.9721E-01				
WOT(101)	7739									

PIC NO	TIME RELTIME	M(T0)	M(T0)/HREF	M(-9T0)	M(-9T0)/HREF	M(-90210)	M(-90210)/HREF	ST(10)
1	1333(125)	3.515E-03	0.1033	4.479E-03	0.1294	4.456E-03	0.1288	2.971E-03
2	2461(125)	3.575E-03	0.1033	4.479E-03	0.1294	4.456E-03	0.1288	2.971E-03
3	1334(125)	3.372E-03	0.0975	4.225E-03	0.1221	4.203E-03	0.1215	2.802E-03
4	7243(125)	3.372E-03	0.0975	4.225E-03	0.1221	4.203E-03	0.1215	2.802E-03
5	5421(125)	3.344E-03	0.0973	4.219E-03	0.1219	4.198E-03	0.1213	2.797E-03
6	1334(125)	3.147E-03	0.0924	4.005E-03	0.1157	3.984E-03	0.1151	2.655E-03
7	7243(125)	3.147E-03	0.0924	4.005E-03	0.1157	3.984E-03	0.1151	2.655E-03
8	5421(125)	3.147E-03	0.0924	4.005E-03	0.1157	3.984E-03	0.1151	2.655E-03
9	1334(125)	3.046E-03	0.0880	3.811E-03	0.1103	3.796E-03	0.1097	2.530E-03
10	7243(125)	3.046E-03	0.0880	3.811E-03	0.1103	3.796E-03	0.1097	2.530E-03
11	5421(125)	3.046E-03	0.0880	3.811E-03	0.1103	3.796E-03	0.1097	2.530E-03
12	1334(125)	2.915E-03	0.0842	3.651E-03	0.1055	3.633E-03	0.1050	2.420E-03
13	7243(125)	2.915E-03	0.0842	3.651E-03	0.1055	3.633E-03	0.1050	2.420E-03
14	5421(125)	2.915E-03	0.0842	3.651E-03	0.1055	3.633E-03	0.1050	2.420E-03
15	1334(125)	2.744E-03	0.0809	3.504E-03	0.1013	3.484E-03	0.1008	2.324E-03
16	7243(125)	2.744E-03	0.0809	3.504E-03	0.1013	3.484E-03	0.1008	2.324E-03
17	5421(125)	2.744E-03	0.0809	3.504E-03	0.1013	3.484E-03	0.1008	2.324E-03
18	1334(125)	2.646E-03	0.0779	3.374E-03	0.0976	3.360E-03	0.0971	2.239E-03
19	7243(125)	2.646E-03	0.0779	3.374E-03	0.0976	3.360E-03	0.0971	2.239E-03
20	5421(125)	2.646E-03	0.0779	3.374E-03	0.0976	3.360E-03	0.0971	2.239E-03
21	1334(125)	2.646E-03	0.0752	3.242E-03	0.0942	3.245E-03	0.0937	2.162E-03
22	7243(125)	2.646E-03	0.0752	3.242E-03	0.0942	3.245E-03	0.0937	2.162E-03
23	5421(125)	2.646E-03	0.0752	3.242E-03	0.0942	3.245E-03	0.0937	2.162E-03
24	1334(125)	2.542E-03	0.0729	3.144E-03	0.0913	3.144E-03	0.0909	2.094E-03
25	7243(125)	2.542E-03	0.0729	3.144E-03	0.0913	3.144E-03	0.0909	2.094E-03
26	5421(125)	2.542E-03	0.0729	3.144E-03	0.0913	3.144E-03	0.0909	2.094E-03
27	1334(125)	2.542E-03	0.0729	3.144E-03	0.0913	3.144E-03	0.0909	2.094E-03
28	7243(125)	2.542E-03	0.0729	3.144E-03	0.0913	3.144E-03	0.0909	2.094E-03
29	5421(125)	2.542E-03	0.0729	3.144E-03	0.0913	3.144E-03	0.0909	2.094E-03
30	1334(125)	2.542E-03	0.0729	3.144E-03	0.0913	3.144E-03	0.0909	2.094E-03

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7/10/73

NASA-BI ORBITER PEATING AEDC(ARO-INC.) ARNOLD AFS, TENNESSEE  
 VOM KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL B  
 VA2A9

GROUP	CMPTG	MODEL	MACH NO	PO(PSIA)	TO(EG R)	ALPHA-MODEL	ALPHA-SECTOR	ALPHA-PREBEND	ROLL-MODEL	YAW																																	
115	4	ORBITER B1	7.97	424.7	1308	24.99	5.01	-30.00	-180.00	-0.00																																	
<table border="0"> <tr> <td>Y-1AF</td> <td>P-1AF</td> <td>O-1AF</td> <td>V-1AF</td> <td>RNO-1AF</td> <td>WU-1AF</td> <td>HF/FT</td> <td>MREF</td> <td>STWEF</td> <td colspan="2"></td> </tr> <tr> <td>(DEG R)</td> <td>(DEG R)</td> <td>(PSIA)</td> <td>(FT/SEC)</td> <td>(SLUGS/FT<sup>3</sup>)</td> <td>(LH-SKC/FT<sup>2</sup>)</td> <td>(EI-1)</td> <td>(R<sub>0</sub>-0.175EI)</td> <td>(R<sub>0</sub>-0.175EI)</td> <td colspan="2"></td> </tr> <tr> <td>95.5</td> <td>-0.45</td> <td>1.942</td> <td>3814</td> <td>3.417E-05</td> <td>7.680E-08</td> <td>1.945E 06</td> <td>3.441E-02</td> <td>2.914E-02</td> <td colspan="2"></td> </tr> </table>											Y-1AF	P-1AF	O-1AF	V-1AF	RNO-1AF	WU-1AF	HF/FT	MREF	STWEF			(DEG R)	(DEG R)	(PSIA)	(FT/SEC)	(SLUGS/FT <sup>3</sup> )	(LH-SKC/FT <sup>2</sup> )	(EI-1)	(R <sub>0</sub> -0.175EI)	(R <sub>0</sub> -0.175EI)			95.5	-0.45	1.942	3814	3.417E-05	7.680E-08	1.945E 06	3.441E-02	2.914E-02		
Y-1AF	P-1AF	O-1AF	V-1AF	RNO-1AF	WU-1AF	HF/FT	MREF	STWEF																																			
(DEG R)	(DEG R)	(PSIA)	(FT/SEC)	(SLUGS/FT <sup>3</sup> )	(LH-SKC/FT <sup>2</sup> )	(EI-1)	(R <sub>0</sub> -0.175EI)	(R <sub>0</sub> -0.175EI)																																			
95.5	-0.45	1.942	3814	3.417E-05	7.680E-08	1.945E 06	3.441E-02	2.914E-02																																			
<table border="0"> <tr> <td>CAMERA</td> <td>ROLL NO</td> <td>PAINT IFMP (DEG F)</td> <td>INITIAL TEMP (DEG F)</td> <td>SQUARE ROOT (RHO/CAK)</td> <td>TRAR(ITO)</td> <td>BETA(ITO)</td> </tr> <tr> <td>TOP(T)</td> <td>7830</td> <td></td> <td>90</td> <td>-0.524</td> <td>1.007E-01</td> <td>1.9721E-01</td> </tr> <tr> <td>TIME(S)</td> <td>7272</td> <td>225</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>MOTION(S)</td> <td>7339</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </table>											CAMERA	ROLL NO	PAINT IFMP (DEG F)	INITIAL TEMP (DEG F)	SQUARE ROOT (RHO/CAK)	TRAR(ITO)	BETA(ITO)	TOP(T)	7830		90	-0.524	1.007E-01	1.9721E-01	TIME(S)	7272	225					MOTION(S)	7339										
CAMERA	ROLL NO	PAINT IFMP (DEG F)	INITIAL TEMP (DEG F)	SQUARE ROOT (RHO/CAK)	TRAR(ITO)	BETA(ITO)																																					
TOP(T)	7830		90	-0.524	1.007E-01	1.9721E-01																																					
TIME(S)	7272	225																																									
MOTION(S)	7339																																										

451

PIC NO	TIME DELTIME	M(ITO)	M(ITO)/MREF	M(1-9TO)/MREF	M(1-9TO)/MREF	M(1-9TO)/MREF	ST(ITO)
T 1342(1225)	19.40	2.446E-03	.0707	3.064E-03	.0845	3.049E-03	.0881
S 5450(1225)	19.40	2.446E-03	.0707	3.064E-03	.0845	3.049E-03	.0881
M 7271(1225)	19.42	2.446E-03	.0707	3.064E-03	.0845	3.049E-03	.0881
T 1343(1225)	20.47	2.377E-03	.0646	2.977E-03	.0740	2.962E-03	.0740
M 7272(1225)	20.47	2.377E-03	.0646	2.977E-03	.0740	2.962E-03	.0740
S 5451(1225)	20.47	2.377E-03	.0646	2.977E-03	.0740	2.962E-03	.0740
T 1344(1225)	21.57	2.311E-03	.0604	2.895E-03	.0703	2.881E-03	.0703
S 5452(1225)	21.57	2.311E-03	.0604	2.895E-03	.0703	2.881E-03	.0703
M 7273(1225)	21.57	2.311E-03	.0604	2.895E-03	.0703	2.881E-03	.0703
T 1345(1225)	22.65	2.252E-03	.0551	2.822E-03	.0615	2.807E-03	.0615
S 5453(1225)	22.65	2.252E-03	.0551	2.822E-03	.0615	2.807E-03	.0615
M 7274(1225)	22.65	2.252E-03	.0551	2.822E-03	.0615	2.807E-03	.0615
T 1346(1225)	23.83	2.143E-03	.0513	2.747E-03	.0573	2.733E-03	.0573
S 5454(1225)	23.83	2.143E-03	.0513	2.747E-03	.0573	2.733E-03	.0573
M 7275(1225)	23.83	2.143E-03	.0513	2.747E-03	.0573	2.733E-03	.0573
T 1347(1225)	25.05	2.100E-03	.0507	2.631E-03	.0540	2.616E-03	.0540
S 5455(1225)	25.05	2.100E-03	.0507	2.631E-03	.0540	2.616E-03	.0540
M 7276(1225)	25.05	2.100E-03	.0507	2.631E-03	.0540	2.616E-03	.0540
T 1348(1225)	26.63	2.049E-03	.0464	2.630E-03	.0504	2.617E-03	.0504
S 5456(1225)	26.63	2.049E-03	.0464	2.630E-03	.0504	2.617E-03	.0504
M 7277(1225)	26.63	2.049E-03	.0464	2.630E-03	.0504	2.617E-03	.0504
T 1349(1225)	27.91	2.018E-03	.0453	2.524E-03	.0473	2.515E-03	.0473
S 5457(1225)	27.91	2.018E-03	.0453	2.524E-03	.0473	2.515E-03	.0473
M 7278(1225)	27.91	2.018E-03	.0453	2.524E-03	.0473	2.515E-03	.0473
MODEL HAS LEFT CENTERLINE							
T 1349(1225)	24.53	1.945E-03	.0502	2.477E-03	.0704	2.424E-03	.0700
S 5457(1225)	24.53	1.945E-03	.0502	2.477E-03	.0704	2.424E-03	.0700
M 7278(1225)	24.53	1.945E-03	.0502	2.477E-03	.0704	2.424E-03	.0700

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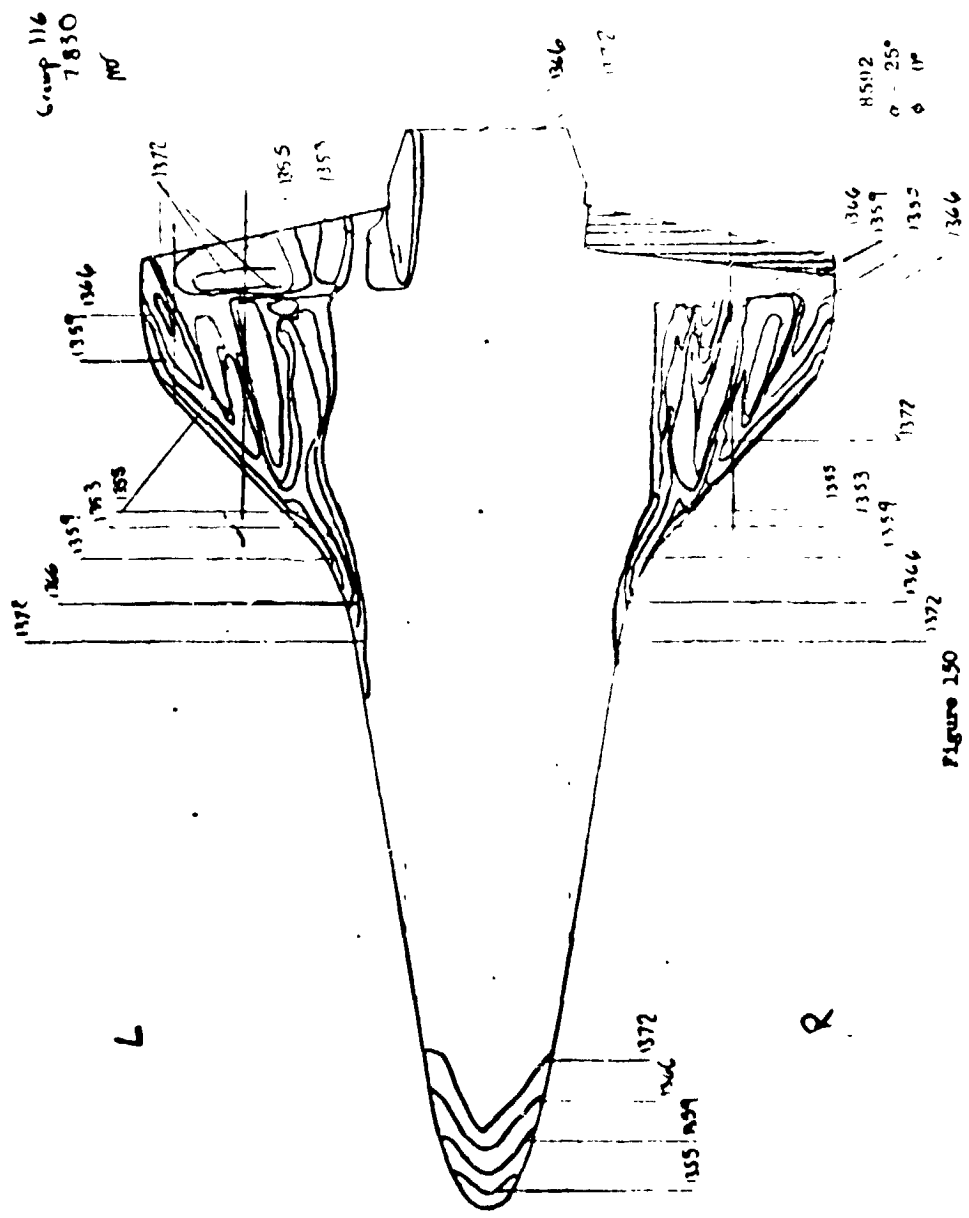


Fig. 1

700

7100

700

4525  
0 - 25°  
0 - 0°

Figure 151

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7/10/73

MASA-RI ORBITER HEATING  
VA289  
AEDC(ARO, INC.) ARNOLD AFS, TENNESSEE  
VON KARMAN GAS DYNAMICS FACILITY  
50 INCH HYPERSONIC TUNNEL B

GROUP	CONFIG	MODEL	WACH NO	PO (PSIA)	TO (DEG F)	ALPHA-MODEL	ALPHA-SECTION	ALPHA-PREBEND	ROLL-MODEL	YAW
116	3	ORBITER E	7.97	424.7	1309	24.99	5.01	-30.00	-18.00	-0.00
T-1NF	P-1NF	Q-1NF	R-1NF	S-1NF	U-1NF	V-1NF	W-1NF	X-1NF	Y-1NF	Z-1NF
IDEG (R)	(PSIA)	(FT/SEC)	(SLUGS/FT <sup>3</sup> )	(LB-SEC/FT <sup>2</sup> )	(FI-1)	(FI-1)	(FI-1)	(FI-1)	(FI-1)	(FI-1)
95.5	.045	1.982	3817	7.915E-05	7.690E-09	1.943E-06	3.4462E-02	2.915E-02		
CAMERA	ROLL NO	PAINT TEMP (DEG F)	INITIAL TEMP (DEG F)	SQUARE ROOT (RHOXCK)	TRAR (TO)	BETA (TO)				
TOP (T)	7830									
SIDE (S)	7272									
NOTCH (R)	7739									

PIC NO	TIME	DELTIME	H(TO)	H(TO)/HREF	H(-910)	H(-910)/HREF	H(-902TO)	H(-902TO)/HREF	ST(TO)
T 1350(300)	1.18		MODEL HAS NOT REACHED CENTERLINE						
S 5054(300)	1.18		MODEL HAS NOT REACHED CENTERLINE						
M 7274(300)	1.18		MODEL HAS NOT REACHED CENTERLINE						
T 1351(300)	2.25		MODEL HAS NOT REACHED CENTERLINE						
S 5459(300)	2.25		MODEL HAS NOT REACHED CENTERLINE						
M 7280(300)	2.25		MODEL HAS NOT REACHED CENTERLINE						
INJECT TIME =	2.20								
T 1352(300)	3.33		DATA NOT YET VALID						
S 5060(300)	3.33		DATA NOT YET VALID						
M 7281(300)	3.33		DATA NOT YET VALID						
T 1353(300)	4.41	3.13	1.018E-02	.2939	1.313E-02	.3792	1.306E-02	.3771	8.411E-03
S 5061(300)	4.41	3.13	1.018E-02	.2939	1.313E-02	.3792	1.306E-02	.3771	8.411E-03
M 7282(300)	4.41	3.13	1.018E-02	.2939	1.313E-02	.3792	1.306E-02	.3771	8.411E-03
T 1354(300)	5.48	4.24	8.777E-03	.2534	1.133E-02	.3270	1.126E-02	.3252	7.253E-03
S 5062(300)	5.48	4.24	8.777E-03	.2534	1.133E-02	.3270	1.126E-02	.3252	7.253E-03
M 7283(300)	5.48	4.24	8.777E-03	.2534	1.133E-02	.3270	1.126E-02	.3252	7.253E-03
T 1355(300)	6.56	5.28	7.811E-03	.2261	1.010E-02	.2918	1.005E-02	.2901	6.472E-03
S 5063(300)	6.56	5.28	7.811E-03	.2261	1.010E-02	.2918	1.005E-02	.2901	6.472E-03
M 7284(300)	6.56	5.28	7.811E-03	.2261	1.010E-02	.2918	1.005E-02	.2901	6.472E-03
T 1356(300)	7.63	6.36	7.138E-03	.2061	9.210E-03	.2660	9.158E-03	.2645	5.900E-03
S 5064(300)	7.63	6.36	7.138E-03	.2061	9.210E-03	.2660	9.158E-03	.2645	5.900E-03
M 7285(300)	7.63	6.36	7.138E-03	.2061	9.210E-03	.2660	9.158E-03	.2645	5.900E-03
T 1357(300)	8.71	7.43	6.612E-03	.1909	8.511E-03	.2463	8.483E-03	.2449	5.461E-03
S 5065(300)	8.71	7.43	6.612E-03	.1909	8.511E-03	.2463	8.483E-03	.2449	5.461E-03
M 7286(300)	8.71	7.43	6.612E-03	.1909	8.511E-03	.2463	8.483E-03	.2449	5.461E-03
T 1358(300)	9.76	8.48	6.178E-03	.1783	7.971E-03	.2301	7.927E-03	.2288	5.102E-03
S 5066(300)	9.76	8.48	6.178E-03	.1783	7.971E-03	.2301	7.927E-03	.2288	5.102E-03
M 7287(300)	9.76	8.48	6.178E-03	.1783	7.971E-03	.2301	7.927E-03	.2288	5.102E-03

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7/10/73

AEDC(ARDC, INC.) ARNOLD AFS, TENNESSEE  
VON KARMAN GAS DYNAMICS FACILITY  
50 INCH HYPERSONIC TUNNEL R

NASA-RI ORBITER HEATING

VA289

GROUP CONFIG MODEL MACH NO D(P(SIA) TO( DEG R) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREHEND ROLL-MODEL YAW  
174 7 ORBITER E 7.97 425.4 1309 24.99 5.01 SINEF -30.00 -180.00 --.00

T-1AF P-1NF Q-1NF V-1NF RHO-1NF MU-1NF RF/FT HREF SINEF  
(DEG R) (PSIA) (PSIA) (FT/SEC) (SLUGS/FT) (LH-SEC/FT) (FI-1) (R= .0175FI) (R= .0175FI)  
95. .045 1.945 3917 3.922E-05 7.590E-08 1.446E 05 3.444E-02 2.913E-02

CAMFRA ROLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHOXCK) TRAN(TO) BETA(TO)  
TOP(T) 7230 300 80 .0544 2.861E-01 3.3076E-01  
SIDE(S) 7272  
MOTTCM(R) 7239

PTC NO TIME RELTIME H(TO) H(TO)/HREF H(1.910) H(1.910)/HREF H(1.9210) H(1.9210)/HREF ST(TO)  
S 5066(1300) 9.79 8.51 6.169E-03 .1781 7.960E-03 .2298 7.915E-03 .2285 5.096E-03  
T 1354(1300) 10.24 9.56 5.820E-03 .1690 7.509E-03 .2168 7.467E-03 .2156 4.807E-03  
R 7282(1300) 10.64 9.56 5.820E-03 .1690 7.509E-03 .2168 7.467E-03 .2156 4.807E-03  
S 5067(1300) 10.66 9.56 5.812E-03 .1674 7.499E-03 .2163 7.457E-03 .2152 4.800E-03  
T 1360(1300) 11.51 10.64 5.518E-03 .1593 7.119E-03 .2055 7.079E-03 .2043 4.556E-03  
S 5068(1300) 11.51 10.64 5.518E-03 .1593 7.119E-03 .2055 7.079E-03 .2043 4.556E-03  
M 7283(1300) 11.51 10.64 5.518E-03 .1593 7.119E-03 .2055 7.079E-03 .2043 4.556E-03  
T 1361(1300) 12.59 11.71 5.258E-03 .1518 6.784E-03 .1958 6.746E-03 .1947 4.342E-03  
S 5069(1300) 12.59 11.71 5.258E-03 .1518 6.784E-03 .1958 6.746E-03 .1947 4.342E-03  
M 7290(1300) 12.59 11.71 5.258E-03 .1518 6.784E-03 .1958 6.746E-03 .1947 4.342E-03  
T 1362(1300) 14.07 12.79 5.032E-03 .1453 6.492E-03 .1874 6.456E-03 .1864 4.156E-03  
S 5070(1300) 14.07 12.79 5.032E-03 .1453 6.492E-03 .1874 6.456E-03 .1864 4.156E-03  
M 7291(1300) 14.07 12.79 5.032E-03 .1453 6.492E-03 .1874 6.456E-03 .1864 4.156E-03  
T 1363(1300) 15.12 13.84 4.837E-03 .1394 6.241E-03 .1801 6.206E-03 .1791 3.993E-03  
S 5071(1300) 15.12 13.84 4.837E-03 .1394 6.241E-03 .1801 6.206E-03 .1791 3.993E-03  
M 7292(1300) 15.12 13.84 4.837E-03 .1394 6.241E-03 .1801 6.206E-03 .1791 3.993E-03  
T 1364(1300) 16.19 14.91 4.659E-03 .1345 6.012E-03 .1735 5.974E-03 .1725 3.846E-03  
S 5072(1300) 16.19 14.91 4.659E-03 .1345 6.012E-03 .1735 5.974E-03 .1725 3.846E-03  
M 7293(1300) 16.19 14.91 4.659E-03 .1345 6.012E-03 .1735 5.974E-03 .1725 3.846E-03  
T 1365(1300) 16.22 14.94 4.500E-03 .1298 5.804E-03 .1675 5.773E-03 .1666 3.713E-03  
S 5073(1300) 16.22 14.94 4.500E-03 .1298 5.804E-03 .1675 5.773E-03 .1666 3.713E-03  
M 7294(1300) 16.22 14.94 4.500E-03 .1298 5.804E-03 .1675 5.773E-03 .1666 3.713E-03  
T 1366(1300) 17.29 16.02 4.446E-03 .1297 5.801E-03 .1674 5.769E-03 .1664 3.710E-03  
S 5074(1300) 17.29 16.02 4.446E-03 .1297 5.801E-03 .1674 5.769E-03 .1664 3.710E-03  
M 7295(1300) 17.25 17.07 4.355E-03 .1257 5.620E-03 .1622 5.584E-03 .1612 3.594E-03  
T 1367(1300) 17.25 17.07 4.355E-03 .1257 5.620E-03 .1622 5.584E-03 .1612 3.594E-03  
S 5075(1300) 17.25 17.07 4.355E-03 .1257 5.620E-03 .1622 5.584E-03 .1612 3.594E-03  
M 7296(1300) 17.25 17.07 4.355E-03 .1257 5.620E-03 .1622 5.584E-03 .1612 3.594E-03

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AFDC(ARO, INC.) ARNOLD AFS, TENNESSEE  
VON KARMAN GAS DYNAMICS FACILITY  
50 INCH HYPERSONIC TUNNEL A

9274

CONFID	MODEL	MACH NO	W(P(SIA)	T(0(EG P)	ALPHA-MODEL	ALPHA-SECTION	ALPHA-PREBEND	ROLL-MODEL	YAW
116	3	ORBITFM E	425.5	1309	24.99	5.01	-30.00	-180.00	-0.00

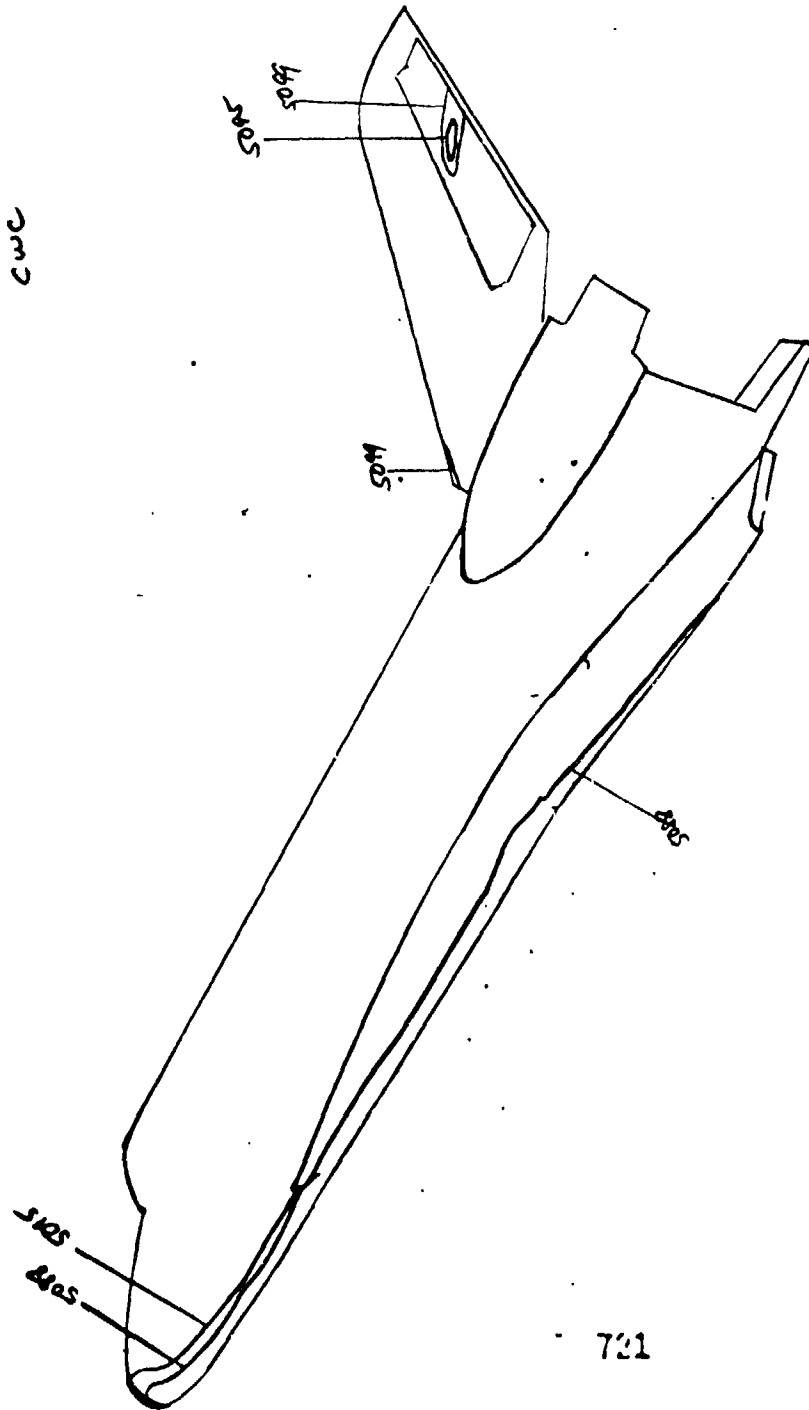
[illegible]

CAMERA	HOLL NO	PAINT TEMP (DEG F)	INITIAL TEMP (DEG F)	SQUARE ROOT (RHOXCAK)	TRANSITO	BETA(TO)
TOP(T)	7230					
SIDE(S)	7272	300	80	.0544	2.861E-01	3.3076E-01

PIC NO.	TIME	DELTIME	H(TO)	HREF	W(910)	H(.970)/HREF	W(.90270)	W(.90270)/HREF	ST(10)
1	1357(300)	19.42	18.14	4.264E-03	5.451E-03	.1219	5.420E-03	.1564	3.487E-03
2	5075(300)	19.42	18.14	4.264E-03	5.451E-03	.1219	5.420E-03	.1564	3.487E-03
3	7246(300)	19.42	18.14	4.264E-03	5.451E-03	.1219	5.420E-03	.1564	3.487E-03
4	1364(303)	20.50	19.22	4.104E-03	5.296E-03	.1184	5.266E-03	.1519	3.386E-03
5	5074(300)	20.50	19.22	4.104E-03	5.296E-03	.1184	5.266E-03	.1519	3.386E-03
6	7247(300)	20.50	19.22	4.104E-03	5.296E-03	.1184	5.266E-03	.1519	3.386E-03
7	1354(300)	21.57	20.30	3.944E-03	5.153E-03	.1153	5.124E-03	.1479	3.297E-03
8	5077(300)	21.57	20.30	3.944E-03	5.153E-03	.1153	5.124E-03	.1479	3.297E-03
9	7248(300)	21.57	20.30	3.944E-03	5.153E-03	.1153	5.124E-03	.1479	3.297E-03
10	1370(300)	22.65	21.37	3.842E-03	5.022E-03	.1123	4.994E-03	.1441	3.214E-03
11	5078(300)	22.65	21.37	3.842E-03	5.022E-03	.1123	4.994E-03	.1441	3.214E-03
12	7249(300)	22.65	21.37	3.842E-03	5.022E-03	.1123	4.994E-03	.1441	3.214E-03
13	1371(300)	24.35	23.07	3.745E-03	4.933E-03	.1081	4.904E-03	.1387	3.092E-03
14	7250(300)	24.35	23.07	3.745E-03	4.933E-03	.1081	4.904E-03	.1387	3.092E-03
15	5079(300)	24.35	23.07	3.745E-03	4.933E-03	.1081	4.904E-03	.1387	3.092E-03
16	1372(300)	26.41	25.13	3.645E-03	4.832E-03	.1036	4.803E-03	.1329	2.962E-03
17	5080(300)	26.41	25.13	3.645E-03	4.832E-03	.1036	4.803E-03	.1329	2.962E-03
18	7251(300)	26.41	25.13	3.645E-03	4.832E-03	.1036	4.803E-03	.1329	2.962E-03
MODEL HAS LEFT CENTERLINE									
19	1373(300)	28.63	27.35	3.549E-03	4.732E-03	.1036	4.703E-03	.1329	2.962E-03
20	5081(300)	28.63	27.35	3.549E-03	4.732E-03	.1036	4.703E-03	.1329	2.962E-03
21	7252(300)	28.63	27.35	3.549E-03	4.732E-03	.1036	4.703E-03	.1329	2.962E-03
22	1374(300)	30.49	29.21	3.453E-03	4.631E-03	.0944	4.602E-03	.1278	2.847E-03
23	5082(300)	30.49	29.21	3.453E-03	4.631E-03	.0944	4.602E-03	.1278	2.847E-03
24	7253(300)	30.49	29.21	3.453E-03	4.631E-03	.0944	4.602E-03	.1278	2.847E-03
25	5083(300)	30.46	29.18	3.351E-03	4.531E-03	.0996	4.502E-03	.1277	2.847E-03
26	7254(300)	30.46	29.18	3.351E-03	4.531E-03	.0996	4.502E-03	.1277	2.847E-03
27	1375(300)	33.49	32.21	3.249E-03	4.431E-03	.0960	4.402E-03	.1232	2.746E-03
28	5084(300)	33.49	32.21	3.249E-03	4.431E-03	.0960	4.402E-03	.1232	2.746E-03
29	7255(300)	33.49	32.21	3.249E-03	4.431E-03	.0960	4.402E-03	.1232	2.746E-03

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7272  
GP117  
CWC



721

Figure 152

7830  
08117  
CWC

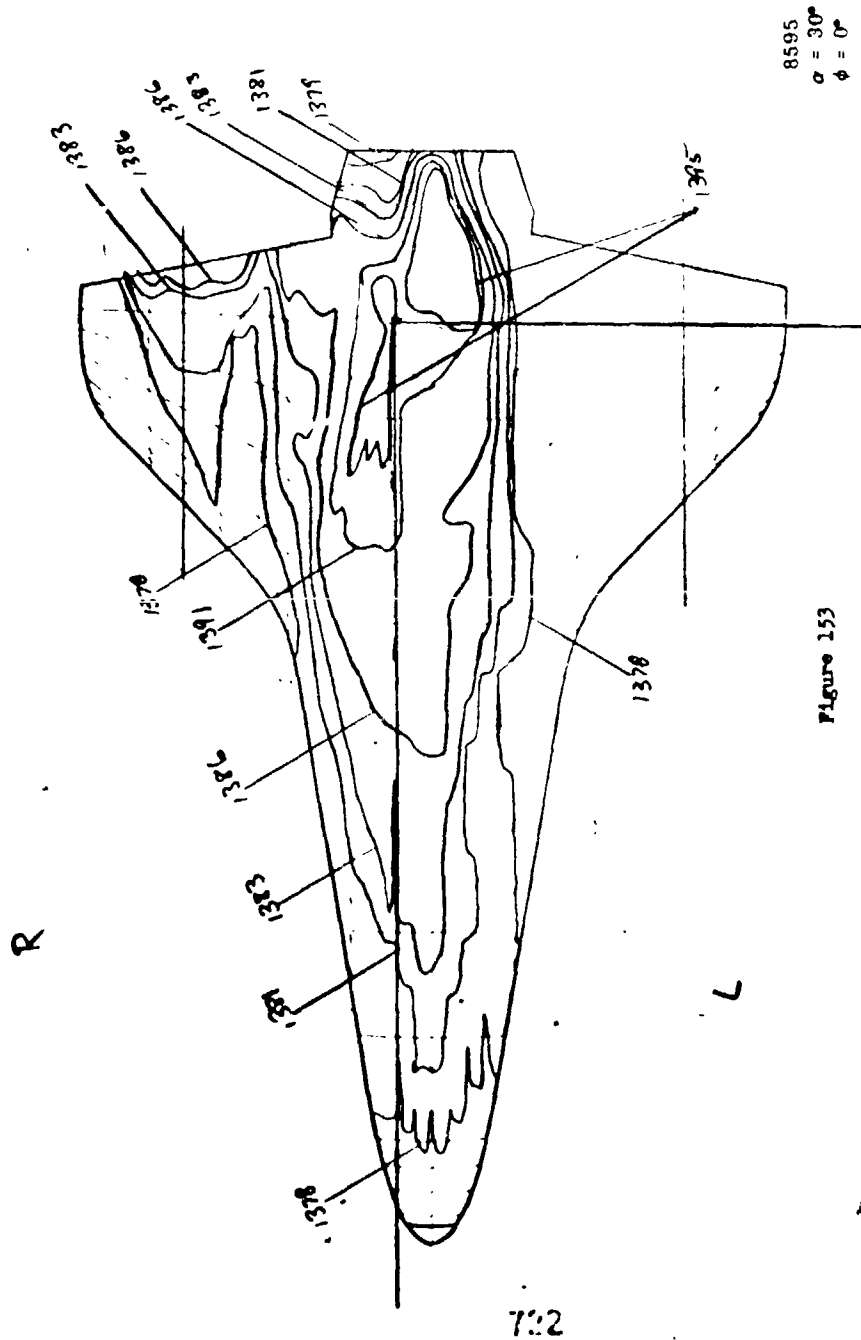


Figure 153



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7/10/73

NASA-R1 ORBITER HEATING

AEDC(ARL) INC. ARNOLD AFS, TENNESSEE  
 VON KAMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL R

VA299

GROUP CONFIG MODEL MACH NO P(PSIA) T(°K) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREBEND ROLL-MODEL YAW  
 117 6 ORBITER R3 7.97 424.4 1309 30.02 -0.02 -30.00 -180.00 -0.00

T-INF P-INF Q-INF V-INF RHO-INF MU-INF PE/FT HREF STREF  
 (DEG R) (PSIA) (PSIA) (FT/SEC) (SLUGS/FT3) (LB-SEC/FT2) (FT-1) (R=0.175FT) (R=0.175FT)  
 95.6 -0.45 1.981 3817 3.913F-05 7.689F-08 1.942E 06 3.446E-02 2.316E-02

CAMERA ROLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (IN/SEC) TRAR(TO) BE1A(TO)  
 TOP(T) 7830  
 SIDE(S) 7272  
 BOTTOM(B) 7739

PIC NO TIME DELTIME H(TO) H(TO)/HREF H(.910) H(.912TO)/HREF H(.912TO)/HREF ST(TO)

S 5083(200) 1.18 MODEL HAS NOT REACHED CENTERLINE  
 M 7304(200) 1.18 MODEL HAS NOT REACHED CENTERLINE  
 T 1375(200) 1.20 MODEL HAS NOT REACHED CENTERLINE  
 T 1376(200) 2.25 MODEL HAS NOT REACHED CENTERLINE  
 S 5084(200) 2.25 MODEL HAS NOT REACHED CENTERLINE  
 M 7305(200) 2.25 MODEL HAS NOT REACHED CENTERLINE

INJECT TIME = 2.30

T 1377(200) 3.23 DATA NOT YET VALID

S 5085(200) 3.23 DATA NOT YET VALID

M 7306(200) 3.23 DATA NOT YET VALID

T 1378(200) 4.41 3.11 4.575F-03 .1322 5.484E-03 .1642 5.517E-03 .1594 3.804E-03  
 S 5086(200) 4.41 3.11 4.575F-03 .1322 5.484E-03 .1642 5.517E-03 .1594 3.804E-03  
 M 7307(200) 4.41 3.11 4.575F-03 .1322 5.484E-03 .1642 5.517E-03 .1594 3.804E-03  
 T 1379(200) 5.46 4.14 3.943F-03 .1142 4.914E-03 .1419 4.770E-03 .1378 3.288E-03  
 S 5087(200) 5.46 4.14 3.943F-03 .1142 4.914E-03 .1419 4.770E-03 .1378 3.288E-03  
 M 7308(200) 5.46 4.14 3.943F-03 .1142 4.914E-03 .1419 4.770E-03 .1378 3.288E-03  
 T 1380(200) 6.53 5.24 3.524F-03 .1019 4.370E-03 .1262 4.242E-03 .1225 2.924E-03  
 S 5088(200) 6.53 5.24 3.524F-03 .1019 4.370E-03 .1262 4.242E-03 .1225 2.924E-03  
 M 7309(200) 6.53 5.24 3.524F-03 .1019 4.370E-03 .1262 4.242E-03 .1225 2.924E-03  
 T 1381(200) 7.61 6.32 3.211F-03 .0928 3.990E-03 .1153 3.873E-03 .1119 2.670E-03  
 S 5089(200) 7.61 6.32 3.211F-03 .0928 3.990E-03 .1153 3.873E-03 .1119 2.670E-03  
 M 7310(200) 7.61 6.32 3.211F-03 .0928 3.990E-03 .1153 3.873E-03 .1119 2.670E-03  
 T 1382(200) 8.68 7.39 2.965F-03 .0857 3.688E-03 .1065 3.580E-03 .1034 2.469E-03  
 S 5090(200) 8.68 7.39 2.965F-03 .0857 3.688E-03 .1065 3.580E-03 .1034 2.469E-03  
 M 7311(200) 8.68 7.39 2.965F-03 .0857 3.688E-03 .1065 3.580E-03 .1034 2.469E-03  
 T 1383(200) 9.76 8.47 2.773F-03 .0801 3.446E-03 .0995 3.345E-03 .0966 2.305E-03  
 S 5091(200) 9.76 8.47 2.773F-03 .0801 3.446E-03 .0995 3.345E-03 .0966 2.305E-03  
 M 7312(200) 9.76 8.47 2.773F-03 .0801 3.446E-03 .0995 3.345E-03 .0966 2.305E-03

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7/10/73

NASA-RI ORBITER HEATING  
AEDC(ARND, INC.) ARNOLD AFS, TENNESSEE  
VON KARMAN GAS DYNAMICS FACILITY  
50 INCH HYPERSONIC TUNNEL R

VA2R9

GROUP CONFIG MODEL MACH NO PO(PSIA) TO( DEG R) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREBEND ROLL-MODEL YAW  
117 6 CRITER R3 7.97 424.9 1309 30.02 -.02 -30.00 -180.00 -.00  
T-INF P-INF O-INF V-INF MU-INF RHO-INF RF/FT HREF SIREF  
(DEG R) (PSIA) (PSIA) (FT/SEC) (SLUGS/FT<sup>3</sup>) (LH-SEC/ET2) (ET-1) (R<sub>W</sub>-.0175FI) (R<sub>W</sub>-.0175FI)  
95.5 .045 1.943 3814 3.018F-05 7.249E-08 1.945E 06 3.462E-02 2.914E-02  
CAMERA ROLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHOXCK) TRAR(TO) BETA(TO)  
TOP(T) 7630  
SICF(S) 7272  
BOTTOM(B) 7739

PTC NO	TIME	DELTIME	H(TO)	H(TO)/HREF	H(.910)	H(.910)/HREF	H(.912TO)	H(.912TO)/HREF	ST(TO)
T 1284(1200)	10.84	9.54	2.612E-03	.0754	3.246E-03	.0937	3.150E-03	.0910	2.171E-03
S 5092(1200)	10.84	9.54	2.612E-03	.0754	3.246E-03	.0937	3.150E-03	.0910	2.171E-03
M 7213(1200)	10.84	9.54	2.612E-03	.0754	3.246E-03	.0937	3.150E-03	.0910	2.171E-03
T 1284(1200)	11.89	10.60	2.479E-03	.0715	3.030E-03	.0869	2.900E-03	.0863	2.059E-03
S 5093(1200)	11.91	10.62	2.476E-03	.0715	3.027E-03	.0869	2.907E-03	.0862	2.058E-03
M 7214(1200)	11.91	10.62	2.476E-03	.0715	3.027E-03	.0869	2.907E-03	.0862	2.058E-03
T 1284(1200)	12.56	11.67	2.362E-03	.0682	2.935E-03	.0847	2.849E-03	.0823	1.962E-03
S 5094(1200)	12.56	11.67	2.362E-03	.0682	2.935E-03	.0847	2.849E-03	.0823	1.962E-03
M 7215(1200)	12.56	11.67	2.362E-03	.0682	2.935E-03	.0847	2.849E-03	.0823	1.962E-03
T 1284(1200)	12.59	11.70	2.360E-03	.0681	2.932E-03	.0846	2.846E-03	.0822	1.960E-03
S 5095(1200)	12.59	11.70	2.360E-03	.0681	2.932E-03	.0846	2.846E-03	.0822	1.960E-03
M 7216(1200)	12.59	11.70	2.360E-03	.0681	2.932E-03	.0846	2.846E-03	.0822	1.960E-03
T 1284(1200)	13.07	12.77	2.254E-03	.0652	2.806E-03	.0810	2.723E-03	.0786	1.876E-03
S 5096(1200)	13.07	12.77	2.254E-03	.0652	2.806E-03	.0810	2.723E-03	.0786	1.876E-03
M 7217(1200)	13.07	12.77	2.254E-03	.0652	2.806E-03	.0810	2.723E-03	.0786	1.876E-03
T 1284(1200)	13.12	13.82	2.171E-03	.0627	2.697E-03	.0779	2.618E-03	.0756	1.804E-03
S 5097(1200)	13.12	13.82	2.171E-03	.0627	2.697E-03	.0779	2.618E-03	.0756	1.804E-03
M 7218(1200)	13.12	13.82	2.171E-03	.0627	2.697E-03	.0779	2.618E-03	.0756	1.804E-03
T 1284(1200)	13.14	13.85	2.159E-03	.0626	2.694E-03	.0778	2.615E-03	.0755	1.803E-03
S 5098(1200)	13.14	13.85	2.159E-03	.0626	2.694E-03	.0778	2.615E-03	.0755	1.803E-03
M 7219(1200)	13.14	13.85	2.159E-03	.0626	2.694E-03	.0778	2.615E-03	.0755	1.803E-03
T 1284(1200)	13.19	14.90	2.041E-03	.0604	2.544E-03	.0750	2.521E-03	.0728	1.737E-03
S 5099(1200)	13.19	14.90	2.041E-03	.0604	2.544E-03	.0750	2.521E-03	.0728	1.737E-03
M 7220(1200)	13.19	14.90	2.041E-03	.0604	2.544E-03	.0750	2.521E-03	.0728	1.737E-03
T 1284(1200)	13.27	15.98	2.019E-03	.0593	2.509E-03	.0724	2.435E-03	.0703	1.677E-03
S 5100(1200)	13.27	15.98	2.019E-03	.0593	2.509E-03	.0724	2.435E-03	.0703	1.677E-03
M 7221(1200)	13.27	15.98	2.019E-03	.0593	2.509E-03	.0724	2.435E-03	.0703	1.677E-03
T 1284(1200)	13.27	15.98	2.019E-03	.0593	2.509E-03	.0724	2.435E-03	.0703	1.677E-03
S 5101(1200)	13.25	17.05	1.954E-03	.0564	2.428E-03	.0701	2.357E-03	.0680	1.623E-03
M 7222(1200)	13.25	17.05	1.954E-03	.0564	2.428E-03	.0701	2.357E-03	.0680	1.623E-03
T 1284(1200)	13.35	17.05	1.954E-03	.0564	2.428E-03	.0701	2.357E-03	.0680	1.623E-03
S 5102(1200)	13.35	17.05	1.954E-03	.0564	2.428E-03	.0701	2.357E-03	.0680	1.623E-03
M 7223(1200)	13.40	18.10	1.847E-03	.0544	2.357E-03	.0680	2.284E-03	.0660	1.575E-03
T 1284(1200)	13.40	18.10	1.847E-03	.0544	2.357E-03	.0680	2.284E-03	.0660	1.575E-03
S 5103(1200)	13.40	18.10	1.847E-03	.0544	2.357E-03	.0680	2.284E-03	.0660	1.575E-03
M 7224(1200)	13.40	18.10	1.847E-03	.0544	2.357E-03	.0680	2.284E-03	.0660	1.575E-03

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7/10/73

**WASA-R! WRITER FEATURING**

EDC(ARO,INC.) ARNOLD AFS, TENNESSEE  
VON KARMAN GAS DYNAMICS FACILITY  
50 INCH HYPERSONIC TUNNEL A

WA299

GROUP CONFIDENTIAL

COMPTE	MODEL	ORITER A3	MACH NO	PRO(PSIA)	TO( DEG R)	ALPHA-MODEL	ALPHA-SECTION	ALPHA-PREBEND	ROLL-MODEL	YAW
117	6		7.97	425.2	1309	30.02	-0.02	-30.00	-180.00	-0.00
T-INF	P-INF	Q-INF	V-INF	BWQ-INF						

DEG R	(PSIA)	(PSIA)	(FT/SEC)	SHLUGS/FT <sup>3</sup>	MU-INF	RE/FT	MAEF	STREF
90.5	0.045	1.094	3016	3.021E-05	7.649E-00	(E=1)	(R <sub>2</sub> =0.175E1)	(M <sub>2</sub> =0.175E-1)

NAME	NO	DATE	TIME	VALUE
AMFSA	2011	NO	0.0000	2.913E-02
				3.464E-02
				1.940E-06
				1.200E-09

OP(T)	PRINT(TMP (DEG F)	INITIAL TEMP (DEG F)	SQUARE ROOT (RHOXC/K)	TRAR(TO)	BETA(TO)
7830					
7832					

OTFCM(6)	200	R2	
0772	7739		0.0519
			1.538E-01
			1.5550E-01

PIC NO	TIME DELTME
1	10
2	10
3	10
4	10
5	10
6	10
7	10
8	10
9	10
10	10
11	10
12	10
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87	10
88	10
89	10
90	10
91	10
92	10
93	10
94	10
95	10
96	10
97	10
98	10
99	10
100	10

MODEL	M(T10)	M(T0)/MREF	M(.910)	M(.91210)/MREF	M(.91210)	ST(10)
S 5100(200)	19.42	1.895E-03	0.547	2.355E-03	2.286E-03	0.660
S 5101(200)	19.18	1.843E-03	0.512	2.208E-03	2.222E-03	0.662
M 7322(200)	20.47	1.833E-03	0.532	2.299E-03	2.222E-03	0.642
T 1393(200)	20.50	1.841E-03	0.532	2.298E-03	2.221E-03	0.641
T 1394(200)	21.55	1.793E-03	0.518	2.228E-03	2.163E-03	0.664
S 5102(200)	21.55	1.793E-03	0.518	2.228E-03	2.163E-03	0.664
M 7323(200)	21.55	1.793E-03	0.518	2.228E-03	2.163E-03	0.664
T 1395(200)	21.55	1.793E-03	0.518	2.228E-03	2.163E-03	0.664
S 5103(200)	22.63	1.747E-03	0.504	2.171E-03	2.107E-03	0.624
M 7324(200)	22.63	1.747E-03	0.504	2.171E-03	2.107E-03	0.624
T 1396(200)	23.85	1.699E-03	0.490	2.111E-03	2.049E-03	0.608
S 5104(200)	23.85	1.699E-03	0.490	2.111E-03	2.049E-03	0.608
M 7325(200)	23.85	1.699E-03	0.490	2.111E-03	2.049E-03	0.608
T 1397(200)	25.00	1.627E-03	0.470	2.021E-03	1.962E-03	0.592
S 5105(200)	25.00	1.627E-03	0.470	2.021E-03	1.962E-03	0.592
M 7326(200)	25.00	1.627E-03	0.470	2.021E-03	1.962E-03	0.592
T 1398(200)	26.61	1.564E-03	0.451	1.943E-03	1.885E-03	0.566
S 5106(200)	26.61	1.564E-03	0.451	1.943E-03	1.885E-03	0.566
M 7327(200)	26.61	1.564E-03	0.451	1.943E-03	1.885E-03	0.566
T 1399(200)	27.56	1.507E-03	0.435	1.873E-03	1.818E-03	0.544
S 5107(200)	27.56	1.507E-03	0.435	1.873E-03	1.818E-03	0.544
M 7328(200)	27.56	1.507E-03	0.435	1.873E-03	1.818E-03	0.544
T 1400(200)	28.69	1.451E-03	0.419	1.817E-03	1.761E-03	0.525
S 5108(200)	28.69	1.451E-03	0.419	1.817E-03	1.761E-03	0.525
M 7329(200)	28.69	1.451E-03	0.419	1.817E-03	1.761E-03	0.525
T 1401(200)	29.63	1.405E-03	0.403	1.761E-03	1.705E-03	0.508
S 5109(200)	29.63	1.405E-03	0.403	1.761E-03	1.705E-03	0.508
M 7330(200)	29.63	1.405E-03	0.403	1.761E-03	1.705E-03	0.508
T 1402(200)	30.67	1.359E-03	0.387	1.705E-03	1.649E-03	0.492
S 5110(200)	30.67	1.359E-03	0.387	1.705E-03	1.649E-03	0.492
M 7331(200)	30.67	1.359E-03	0.387	1.705E-03	1.649E-03	0.492
T 1403(200)	31.71	1.313E-03	0.371	1.649E-03	1.593E-03	0.476
S 5111(200)	31.71	1.313E-03	0.371	1.649E-03	1.593E-03	0.476
M 7332(200)	31.71	1.313E-03	0.371	1.649E-03	1.593E-03	0.476
T 1404(200)	32.75	1.267E-03	0.355	1.593E-03	1.537E-03	0.460
S 5112(200)	32.75	1.267E-03	0.355	1.593E-03	1.537E-03	0.460
M 7333(200)	32.75	1.267E-03	0.355	1.593E-03	1.537E-03	0.460
T 1405(200)	33.79	1.221E-03	0.339	1.537E-03	1.481E-03	0.444
S 5113(200)	33.79	1.221E-03	0.339	1.537E-03	1.481E-03	0.444
M 7334(200)	33.79	1.221E-03	0.339	1.537E-03	1.481E-03	0.444

7272  
81  
GP  
CWC

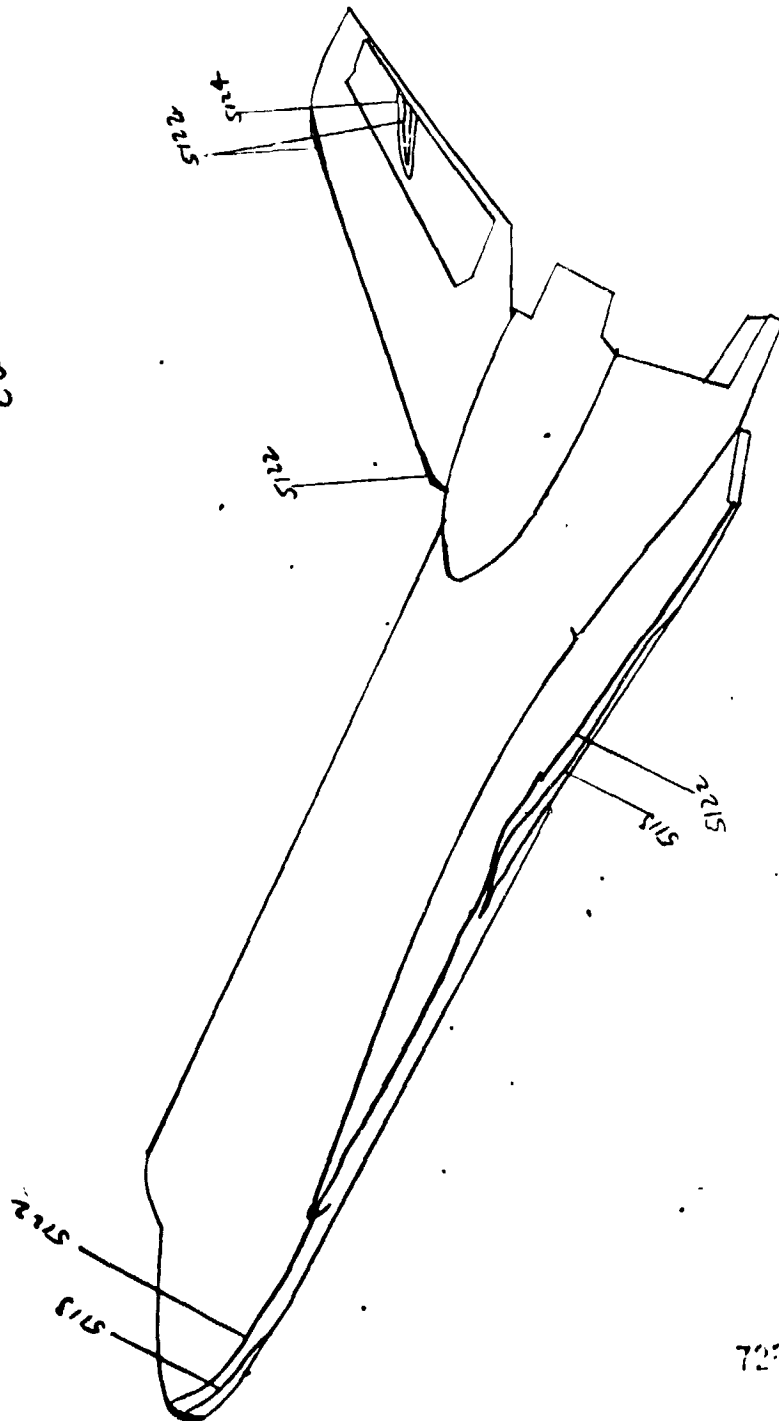


Figure 154



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7/10/77

NASA-R1 ORBITER HEATING  
 VA289  
 AEDCIARD (AC-1) ARNOLD AFB, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL R

GROUP	CONFIG	MODEL	MACH NO	DT(PISA)	TO(DEL R)	ALPHA-MODEL	ALPHA-SECTION	ALPHA-PREBEND	ROLL-MODEL	YAW
114	2	ORBITER S	7.99	403.0	1304	30.03	-0.03	-30.00	-120.00	-0.00
T-1NF	P-1NF	Q-1NF	V-1NF	W-1NF	MU-1NF	DE/FT	MREF	S'REF		
(DEL R)	(PSIA)	(BT/SEC)	(SLUGS/FT2)	(LH-SEC/FT2)	(FT-1)	(R= .0175F)	(R= .0175F)	(R= .0175F)		
94.7	2.743	3810	5.517E-05	7.623E-09	2.157E 04	4.009E-02	2.455E-02			

CAMFRA MOLL NO PAINT IFWP (DEL F) INITIAL TEMP (DEL F) SQUARE ROOT (RHOCAR) TRAN(10) BETA(10)

7830 7272 7739 250 R2 .0535 0 0

PIC NO TIME RELTIME HIT(1) HIT(2)/MREF H(-910)/MREF H(-9120) H(-9120)/MREF ST(10)

S 5104(150)	1.1P	MODEL HAS NOT REACHED CENTERLINE	9.130E-03	.2270	8.837E-03	.2158	4.263E-03
M 7324(150)	1.1P	MODEL HAS NOT REACHED CENTERLINE	9.130E-03	.2270	8.837E-03	.2158	4.263E-03
T 1401(150)	1.20	MODEL HAS NOT REACHED CENTERLINE	9.130E-03	.2270	8.837E-03	.2158	4.263E-03
S 5111(150)	2.25	MODEL HAS NOT REACHED CENTERLINE	7.870E-03	.1922	7.617E-03	.1860	3.675E-03
M 7331(150)	2.25	MODEL HAS NOT REACHED CENTERLINE	7.870E-03	.1922	7.617E-03	.1860	3.675E-03
T 1401(150)	2.25	MODEL HAS NOT REACHED CENTERLINE	7.870E-03	.1922	7.617E-03	.1860	3.675E-03
S 5111(150)	3.23	DATA NOT YET VALID	7.870E-03	.1922	7.617E-03	.1860	3.675E-03
M 7331(150)	3.23	DATA NOT YET VALID	7.870E-03	.1922	7.617E-03	.1860	3.675E-03
T 1401(150)	3.23	DATA NOT YET VALID	7.870E-03	.1922	7.617E-03	.1860	3.675E-03
S 5111(150)	4.41	7.214E-03	.1762	6.794E-03	.1660	3.280E-03	
M 7331(150)	4.41	7.214E-03	.1762	6.794E-03	.1660	3.280E-03	
T 1401(150)	4.41	7.214E-03	.1762	6.794E-03	.1660	3.280E-03	
S 5111(150)	5.49	7.214E-03	.1762	6.794E-03	.1660	3.280E-03	
M 7331(150)	5.49	7.214E-03	.1762	6.794E-03	.1660	3.280E-03	
T 1401(150)	5.49	7.214E-03	.1762	6.794E-03	.1660	3.280E-03	
S 5111(150)	6.49	7.214E-03	.1762	6.794E-03	.1660	3.280E-03	
M 7331(150)	6.49	7.214E-03	.1762	6.794E-03	.1660	3.280E-03	
T 1401(150)	6.49	7.214E-03	.1762	6.794E-03	.1660	3.280E-03	
S 5111(150)	7.49	7.214E-03	.1762	6.794E-03	.1660	3.280E-03	
M 7331(150)	7.49	7.214E-03	.1762	6.794E-03	.1660	3.280E-03	
T 1401(150)	7.49	7.214E-03	.1762	6.794E-03	.1660	3.280E-03	
S 5111(150)	8.49	7.214E-03	.1762	6.794E-03	.1660	3.280E-03	
M 7331(150)	8.49	7.214E-03	.1762	6.794E-03	.1660	3.280E-03	
T 1401(150)	8.49	7.214E-03	.1762	6.794E-03	.1660	3.280E-03	
S 5111(150)	9.49	7.214E-03	.1762	6.794E-03	.1660	3.280E-03	
M 7331(150)	9.49	7.214E-03	.1762	6.794E-03	.1660	3.280E-03	
T 1401(150)	9.49	7.214E-03	.1762	6.794E-03	.1660	3.280E-03	

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7/10/77

AEDC(AW-1) ARNOLD AFB, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL

NASA-PI ORBITER HEATING

W220

WINDUP CAMFIC MODEL MACH NO PO(PISA) TO(DEC R) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREBEND ROLL-MODEL YAW  
 114 2 0RETEW S 7.99 401.5 1304 30.03 -0.03 -30.00 -180.00 -0.00  
 T-INF P-INF U-INF V-INF MU-INF RU-INF DE/FT HREF STREF  
 (DEC M) (PISA) (PISA) (FT/SEC) (SLUGS/FT<sup>3</sup>) (LBS-SEC/FT<sup>2</sup>) (FT-LB) (R= .0175F1) (R= .0175F1)  
 94.7 .062 2.776 3810 5.503E-05 7.623F-04 2.750E 04 4.094E-02 2.459F-02

CAMERA ROLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHO/CXK) TRAR(10) BETA(10)

TOP(1) 7230  
 SIC(1) 7272  
 MOTION(R) 7739

M2

.0535

2.206E-01 2.3789E-01

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PIC NO	TIME	DELTIME	M(10)	M(10)/HREF	M(-010)	M(-010)/HREF	M(-012T0)	M(-012T0)/HREF	ST(10)
M 7334(1250)	10.04	9.54	4.120E-03	.1004	5.214E-03	.1274	5.046E-03	.1233	2.436E-03
T 1404(1250)	10.06	9.57	4.114E-03	.1005	5.207E-03	.1272	5.039E-03	.1231	2.434E-03
S 5117(1250)	10.06	9.57	4.114E-03	.1005	5.207E-03	.1272	5.039E-03	.1231	2.434E-03
T 1411(1250)	11.51	10.62	3.905E-03	.0954	4.942E-03	.1208	4.784E-03	.1169	2.310E-03
S 7334(1250)	11.51	10.62	3.905E-03	.0954	4.942E-03	.1208	4.784E-03	.1169	2.310E-03
S 5114(1250)	11.54	10.65	3.901E-03	.0953	4.937E-03	.1206	4.779E-03	.1167	2.307E-03
T 1411(1250)	12.59	11.74	3.721E-03	.0909	4.709E-03	.1151	4.558E-03	.1114	2.202E-03
M 7340(1250)	12.59	11.74	3.721E-03	.0909	4.709E-03	.1151	4.558E-03	.1114	2.202E-03
S 5114(1250)	13.01	11.72	3.717E-03	.0909	4.704E-03	.1149	4.553E-03	.1113	2.199E-03
T 1412(1250)	14.07	12.77	3.501E-03	.0870	4.507E-03	.1101	4.362E-03	.1066	2.106E-03
M 7341(1250)	14.07	12.77	3.501E-03	.0870	4.507E-03	.1101	4.362E-03	.1066	2.106E-03
S 5121(1250)	14.09	12.80	3.555E-03	.0869	4.532E-03	.1100	4.358E-03	.1065	2.104E-03
T 1413(1250)	15.14	13.45	3.420E-03	.0836	4.324E-03	.1058	4.189E-03	.1024	2.023E-03
M 7342(1250)	15.14	13.45	3.420E-03	.0836	4.324E-03	.1058	4.189E-03	.1024	2.023E-03
S 5121(1250)	15.17	13.47	3.417E-03	.0835	4.324E-03	.1057	4.189E-03	.1023	2.022E-03
T 1414(1250)	16.22	14.03	3.244E-03	.0805	4.144E-03	.1019	4.039E-03	.0986	1.949E-03
S 5122(1250)	16.22	14.03	3.244E-03	.0805	4.144E-03	.1019	4.039E-03	.0986	1.949E-03
M 7343(1250)	16.22	14.03	3.244E-03	.0805	4.144E-03	.1019	4.039E-03	.0986	1.949E-03
T 1415(1250)	17.29	14.00	3.102E-03	.0774	4.024E-03	.0984	3.897E-03	.0952	1.883E-03
S 5113(1250)	17.29	14.00	3.102E-03	.0774	4.024E-03	.0984	3.897E-03	.0952	1.883E-03
M 7344(1250)	17.29	14.00	3.102E-03	.0774	4.024E-03	.0984	3.897E-03	.0952	1.883E-03
T 1416(1250)	18.37	17.09	3.000E-03	.0753	3.894E-03	.0952	3.772E-03	.0922	1.822E-03
S 5124(1250)	18.37	17.09	3.000E-03	.0753	3.894E-03	.0952	3.772E-03	.0922	1.822E-03
M 7345(1250)	18.37	17.09	3.000E-03	.0753	3.894E-03	.0952	3.772E-03	.0922	1.822E-03
T 1417(1250)	19.45	18.15	2.907E-03	.0730	3.790E-03	.0924	3.659E-03	.0894	1.768E-03
S 5115(1250)	19.45	18.15	2.907E-03	.0730	3.790E-03	.0924	3.659E-03	.0894	1.768E-03
M 7346(1250)	19.45	18.15	2.907E-03	.0730	3.790E-03	.0924	3.659E-03	.0894	1.768E-03

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7930  
WP 114  
Cure

8595  
 $\alpha = 30^\circ$   
 $\phi = 0^\circ$

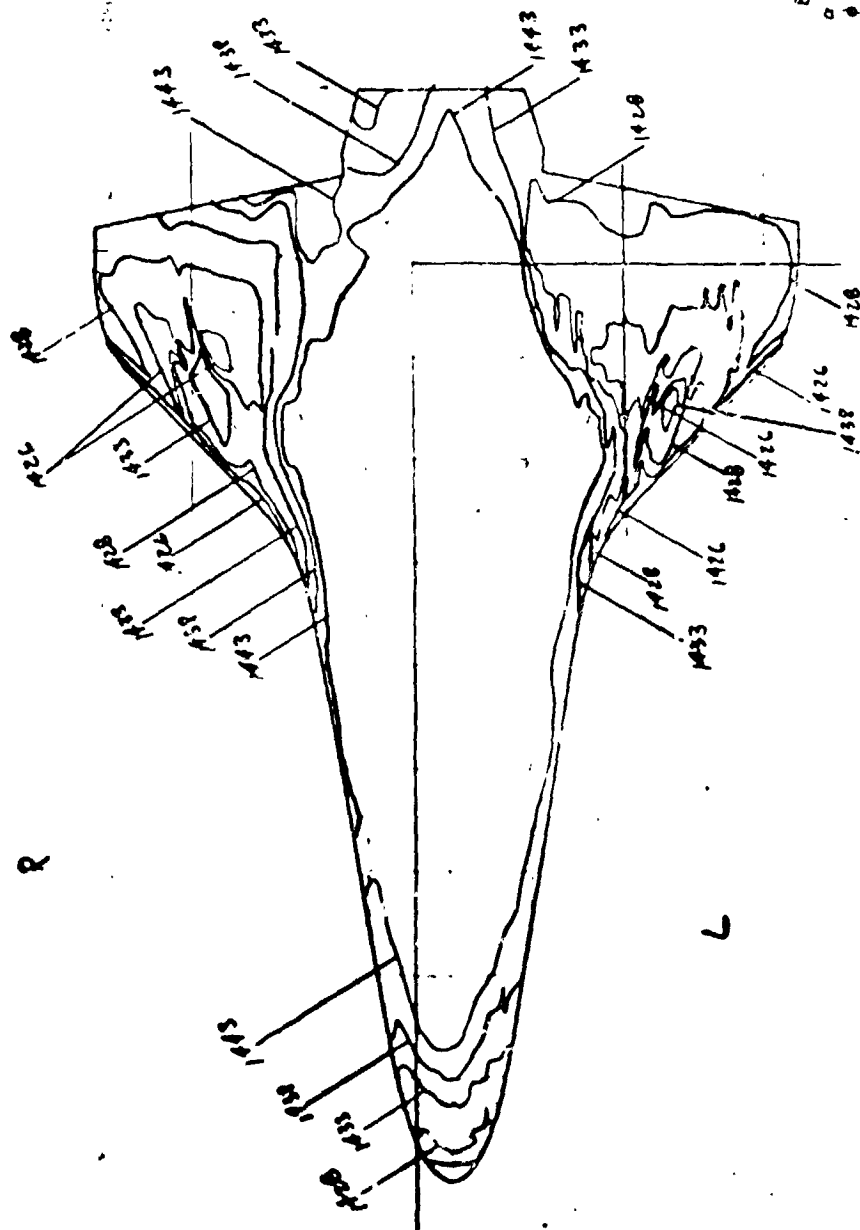


Figure 156

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7/10/73

NASA-RI ORBITER EATING AFDC(APO-INC.) ARMO U AFS, TENNESSEE  
 VOA KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL R

VA2R9

GROUP	CONFIG	MODEL	MACH NO	Q(PSIA)	TO(DEG R)	ALPHA-MODEL	ALPHA-SECTION	ALPHA-PREBEND	ROLL-MODEL	YAW
119	5	ORBITER P2	7.99	597.6	1307	30.03	-0.03	-30.00	-180.00	-0.00
T-INF	P-INF	Q-INF	V-INF	RHO-INF	MU-INF	RE/FT	MREF	SREF		
(DEG R)	(PSIA)	(PSIA)	(FT JEC)	(SLUGS/FT <sup>3</sup> )	(LB-SEC/FT <sup>2</sup> )	(F1-1)	(R <sub>2</sub> -.0175F1)	(R <sub>2</sub> -.0175F1)		
95.0	.062	2.758	3815	5.452E-05	7.640E-08	2.721E 06	4.002E-02	2.470E-02		
CAMERA	MULL NO	PAINT TPMP (DEG F)	INITIAL TEMP (DEG F)	SQUARE ROOT (RHOXCK)	TRAR(TO)	BETA(TO)				
TOP(T)	7630									
SIDE(S)	7496	300								
MOTION(R)	1337									

INJECT TIME = 2.28

PIC NO	TIME DELTIME	H(TO)	H(TO)/HREF	H(.910)	H(.910)/HREF	H(.912TO)	H(.912TO)/HREF	ST(TO)
H 7193(300)	1.15	MODEL HAS NOT REACHED CENTERLINE						
T 1424(300)	1.18	MODEL HAS NOT REACHED CENTERLINE						
S 5165(300)	1.18	MODEL HAS NOT REACHED CENTERLINE						
T 1425(300)	2.42	MODEL HAS NOT REACHED CENTERLINE						
S 5166(300)	2.43	MODEL HAS NOT REACHED CENTERLINE						
H 7194(300)	2.43	MODEL HAS NOT REACHED CENTERLINE						
INJECT TIME = 2.28								
H 7195(300)	3.48	DATA NOT YET VALID						
T 1426(300)	3.50	DATA NOT YET VALID						
S 5167(300)	3.50	DATA NOT YET VALID						
T 1427(300)	4.36	1.004E-02	.2506	1.2 E-02	.3235	1.275E-02	.3121	6.077E-03
S 5168(300)	4.36	1.004E-02	.2506	1.275E-02	.3235	1.275E-02	.3121	6.077E-03
H 7196(300)	4.36	1.004E-02	.2506	1.322E-02	.3235	1.275E-02	.3121	6.077E-03
T 1428(300)	5.41	8.484E-03	.2143	1.141E-02	.2742	1.101E-02	.2694	5.243E-03
S 5169(300)	5.41	8.484E-03	.2143	1.14 E-02	.2742	1.101E-02	.2694	5.243E-03
H 7197(300)	5.43	8.484E-03	.2143	1.137E-02	.2744	1.097E-02	.2686	5.228E-03
T 1429(300)	6.46	7.880E-03	.1930	1.014E-02	.2482	9.827E-03	.2404	4.678E-03
S 5170(300)	6.48	7.880E-03	.1926	1.014E-02	.2486	9.804E-03	.2399	4.668E-03
H 7198(300)	6.48	7.880E-03	.1926	1.014E-02	.2486	9.804E-03	.2399	4.668E-03
T 143 (300)	7.53	7.140E-03	.1757	0.264E-03	.2248	8.942E-03	.2188	4.260E-03
S 5171(300)	7.53	7.140E-03	.1757	9.264E-03	.2248	8.942E-03	.2188	4.260E-03
H 7199(300)	7.53	7.140E-03	.1757	9.264E-03	.2248	8.942E-03	.2188	4.260E-03
T 1431(300)	8.51	6.642E-03	.1423	8.575E-03	.2098	8.274E-03	.2024	3.939E-03
S 5172(300)	8.51	6.642E-03	.1423	8.561E-03	.2095	8.260E-03	.2021	3.933E-03
H 7200(300)	9.52	6.202E-03	.1517	8.006E-03	.2095	8.260E-03	.2021	3.933E-03
T 1432(300)	9.52	6.202E-03	.1517	8.006E-03	.2095	8.260E-03	.2021	3.933E-03
S 5173(300)	9.52	6.202E-03	.1517	8.006E-03	.2095	8.260E-03	.2021	3.933E-03
H 7201(300)	9.56	6.202E-03	.1517	8.006E-03	.2095	8.260E-03	.2021	3.933E-03
T 1433(300)	9.56	6.202E-03	.1517	8.006E-03	.2095	8.260E-03	.2021	3.933E-03
S 5174(300)	9.56	6.202E-03	.1517	8.006E-03	.2095	8.260E-03	.2021	3.933E-03
H 7202(300)	9.56	6.202E-03	.1517	8.006E-03	.2095	8.260E-03	.2021	3.933E-03

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7/10/73

AEDC(AR0) INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL R

NASA-RI AIRCRAFT HEATING

VA249

GROUP CONFIG MODEL MACH NO P0(P5IA) T0(DEC R) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREREND ROLL-MODEL YAW

113 5 GREITER M2 7.99 599.4 130H 30.03 -0.03 -30.00 -180.00 -0.00

T-INF P-INF Q-INF V-INF RHO-INF MU-INF RE/FT HREF STREF

IDEG H) (PSIA) (FT/SEC) (SLUGS/FT3) (LR-SEC/FT2) (FT-1) (R= .0175FI) (R= .0175FI)

95.0 .062 2.766 3816 5.467E-05 7.661E-04 2.728E 04 4.089E-02 2.467E-02

CAMFCA ROLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHOCXK) TRAHITO BETA(10)

TOP(11) 7230 81 .0544 2.856E-01 3.3008E-01

ST(F(S) 7496

WOTTCM(R) 7237

PIC NO	TIME DELTME	H(T0)	HREF	H(910)	H(910)/HREF	H(91210)	H(91210)/HREF	ST(10)
T 1433(300)	10.71	9.43	5.345E-03	5.345E-03	1.430	7.281E-03	1.781	3.464E-03
M 7392(300)	10.71	9.43	5.846E-03	5.846E-03	1.446	7.281E-03	1.741	3.464E-03
M 5174(300)	10.74	9.44	5.838E-03	5.838E-03	1.428	7.272E-03	1.779	3.461E-03
M 7393(300)	11.76	10.48	5.545E-03	5.545E-03	1.156	6.507E-03	1.689	3.286E-03
T 1434(300)	11.79	10.51	5.539E-03	5.539E-03	1.155	6.507E-03	1.687	3.283E-03
T 5175(300)	11.79	10.51	5.539E-03	5.539E-03	1.155	6.507E-03	1.687	3.283E-03
T 1435(300)	12.84	11.54	5.241E-03	5.241E-03	1.292	6.577E-03	1.609	3.131E-03
M 5176(300)	12.84	11.54	5.241E-03	5.241E-03	1.292	6.577E-03	1.609	3.131E-03
M 7394(300)	12.84	11.54	5.241E-03	5.241E-03	1.292	6.577E-03	1.609	3.131E-03
T 1436(300)	13.89	12.61	5.056E-03	5.056E-03	1.237	6.297E-03	1.540	2.996E-03
M 7395(300)	13.89	12.61	5.056E-03	5.056E-03	1.237	6.297E-03	1.540	2.996E-03
S 5177(300)	13.89	12.61	5.056E-03	5.056E-03	1.237	6.297E-03	1.540	2.996E-03
M 7396(300)	14.57	13.64	4.854E-03	4.854E-03	1.187	6.050E-03	1.479	2.876E-03
T 1437(300)	14.57	13.64	4.854E-03	4.854E-03	1.187	6.050E-03	1.479	2.876E-03
S 5178(300)	14.57	13.64	4.854E-03	4.854E-03	1.187	6.050E-03	1.479	2.876E-03
T 1438(300)	15.02	14.74	4.677E-03	4.677E-03	1.144	5.825E-03	1.424	2.770E-03
S 5179(300)	15.02	14.74	4.677E-03	4.677E-03	1.144	5.825E-03	1.424	2.770E-03
M 7397(300)	16.02	16.74	4.677E-03	4.677E-03	1.144	5.825E-03	1.424	2.770E-03
T 1439(300)	17.07	17.74	4.519E-03	4.519E-03	1.105	5.624E-03	1.376	2.676E-03
M 7398(300)	17.07	17.74	4.519E-03	4.519E-03	1.105	5.624E-03	1.376	2.676E-03
S 5180(300)	17.07	17.74	4.519E-03	4.519E-03	1.105	5.624E-03	1.376	2.676E-03
T 1440(300)	17.09	17.82	4.515E-03	4.515E-03	1.104	5.624E-03	1.375	2.674E-03
S 5181(300)	18.15	18.87	4.372E-03	4.372E-03	1.069	5.445E-03	1.331	2.589E-03
T 1441(300)	18.15	18.87	4.372E-03	4.372E-03	1.069	5.445E-03	1.331	2.589E-03
M 7399(300)	18.15	18.87	4.372E-03	4.372E-03	1.069	5.445E-03	1.331	2.589E-03
T 1442(300)	19.20	19.92	4.242E-03	4.242E-03	1.037	5.283E-03	1.292	2.512E-03
M 7400(300)	19.20	19.92	4.242E-03	4.242E-03	1.037	5.283E-03	1.292	2.512E-03

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7/10/73

NASA-BRI ORBITER HEATING

VA249

AEDC(ARO, INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL R

GROUP COMFIC MODEL MACH NO PO(PSTA) TO(IDEG R) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREHEND ROLL-MODEL YAW  
 119 5 ORBITER R2 7.09 599.8 130H 30.03 -0.03 -30.00 -180.00 -0.00

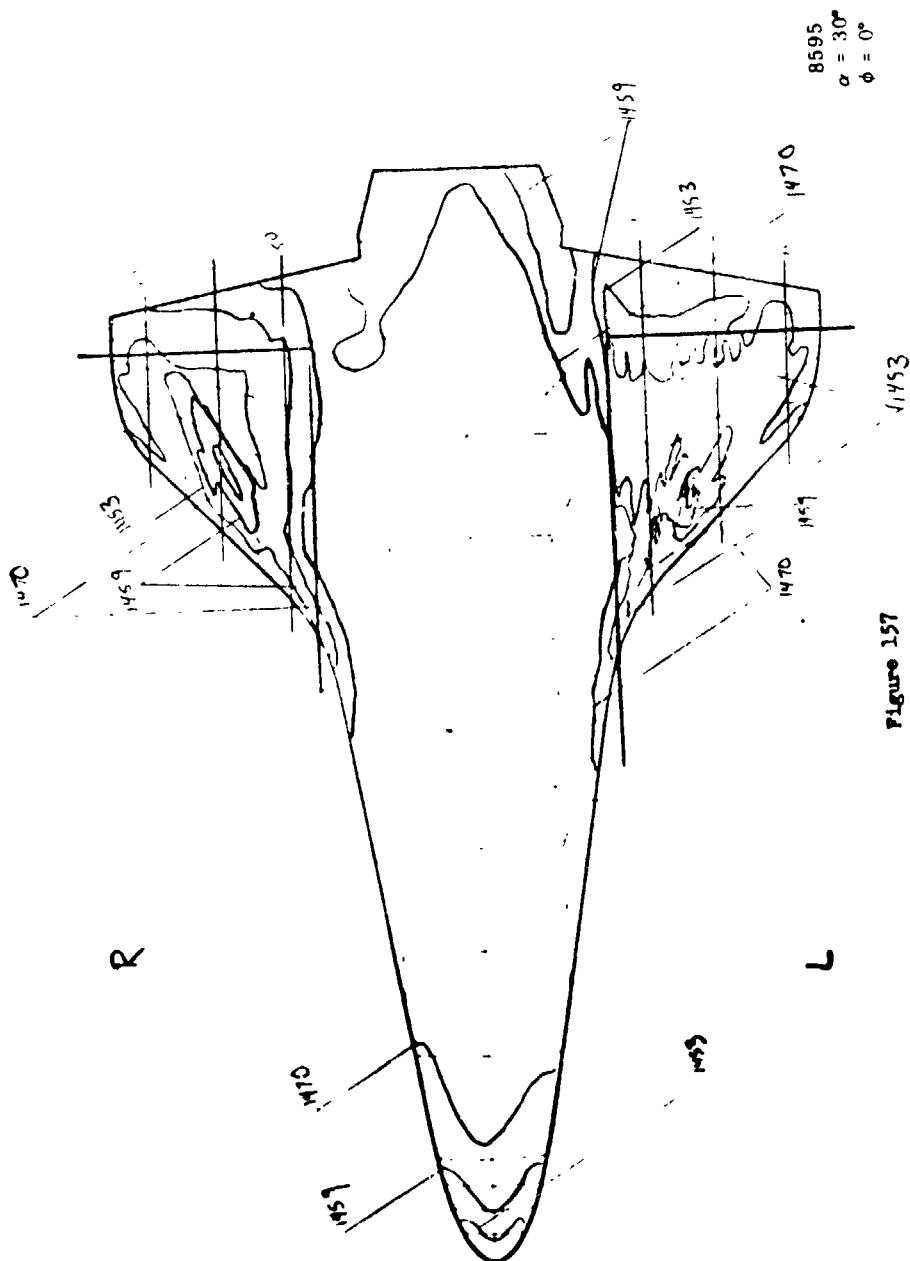
T-INF P-INF Q-INF V-INF RHO-INF MU-INF RF/FT HREF STREF  
 (DEG R) (PSIA) (PSIA) (FT/SEC) (SLUGS/FT<sup>3</sup>) (LBS-SEC/FT<sup>2</sup>) (BTU-1) (BTU-1) (BTU-1) (BTU-1) (BTU-1)  
 95.0 .052 2.708 3816 5.470E-05 7.648E-08 2.729E 06 4.090E-02 2.466E-02

CAMERA ROLL NO PAINT IFMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RH0XCK) TRAR(10) BETA(10)  
 TOP(T) 7830  
 SIRE(S) 7496  
 BOTTOM(B) 7337

81 .0544 2.856E-01 3.3008E-01

PIC NO	TIME DELT	H(10)	H(10)/HREF	H(10)	H(10)/HREF	H(10)	H(10)/HREF	H(10)	H(10)/HREF	H(10)	H(10)/HREF	ST(10)
S 5142(100)	19.22	17.04	4.239E-03	.1036	5.472E-03	.1238	5.280E-03	.1291	5.135E-03	.1255	5.131E-03	2.510E-03
M 7401(100)	20.25	18.07	4.123E-03	.1008	5.322E-03	.1301	5.135E-03	.1255	5.131E-03	.1254	5.131E-03	2.440E-03
T 1442(100)	20.27	18.99	4.120E-03	.1007	5.318E-03	.1300	5.131E-03	.1254	5.131E-03	.1254	5.131E-03	2.440E-03
S 5143(100)	20.27	17.99	4.120E-03	.1007	5.318E-03	.1300	5.131E-03	.1254	5.131E-03	.1254	5.131E-03	2.440E-03
T 1444(100)	21.32	20.05	4.011E-03	.0980	5.177E-03	.1266	4.995E-03	.1221	4.995E-03	.1221	4.995E-03	2.375E-03
S 5144(100)	21.32	20.05	4.011E-03	.0980	5.177E-03	.1266	4.995E-03	.1221	4.995E-03	.1221	4.995E-03	2.375E-03
M 7402(100)	21.32	20.05	4.011E-03	.0980	5.177E-03	.1266	4.995E-03	.1221	4.995E-03	.1221	4.995E-03	2.375E-03
T 1444(100)	22.58	21.70	3.855E-03	.0942	4.976E-03	.1216	4.801E-03	.1174	4.801E-03	.1174	4.801E-03	2.282E-03
S 5145(100)	23.00	21.75	3.855E-03	.0942	4.976E-03	.1216	4.801E-03	.1174	4.801E-03	.1174	4.801E-03	2.282E-03
M 7404(100)	23.00	21.75	3.855E-03	.0942	4.976E-03	.1216	4.801E-03	.1174	4.801E-03	.1174	4.801E-03	2.282E-03
T 1445(100)	25.00	23.72	3.645E-03	.0901	4.754E-03	.1163	4.589E-03	.1122	4.589E-03	.1122	4.589E-03	2.182E-03
S 1446(100)	25.00	23.72	3.645E-03	.0901	4.754E-03	.1163	4.589E-03	.1122	4.589E-03	.1122	4.589E-03	2.182E-03
MODEL HAS LEFT CENTERLINE												
M 7405(100)	25.00	25.75	3.534E-03	.0865	4.584E-03	.1117	4.407E-03	.1077	4.407E-03	.1077	4.407E-03	2.095E-03
T 1446(100)	27.06	25.78	3.534E-03	.0865	4.584E-03	.1117	4.407E-03	.1077	4.407E-03	.1077	4.407E-03	2.095E-03
S 5147(100)	27.06	25.78	3.534E-03	.0865	4.584E-03	.1117	4.407E-03	.1077	4.407E-03	.1077	4.407E-03	2.095E-03
M 7406(100)	27.06	27.72	3.417E-03	.0832	4.394E-03	.1075	4.243E-03	.1037	4.243E-03	.1037	4.243E-03	2.016E-03
T 1447(100)	29.08	27.80	3.417E-03	.0832	4.394E-03	.1075	4.243E-03	.1037	4.243E-03	.1037	4.243E-03	2.016E-03
S 5148(100)	29.08	27.80	3.417E-03	.0832	4.394E-03	.1075	4.243E-03	.1037	4.243E-03	.1037	4.243E-03	2.016E-03
M 7407(100)	31.11	29.83	3.244E-03	.0803	4.244E-03	.1037	4.095E-03	.1001	4.095E-03	.1001	4.095E-03	1.946E-03
T 1448(100)	31.11	29.83	3.244E-03	.0803	4.244E-03	.1037	4.095E-03	.1001	4.095E-03	.1001	4.095E-03	1.946E-03
S 5149(100)	31.11	29.83	3.244E-03	.0803	4.244E-03	.1037	4.095E-03	.1001	4.095E-03	.1001	4.095E-03	1.946E-03
M 7408(100)	31.11	29.83	3.244E-03	.0803	4.244E-03	.1037	4.095E-03	.1001	4.095E-03	.1001	4.095E-03	1.946E-03

Group 120  
1830  
m2



8595  
 $\alpha = 30^\circ$   
 $\phi = 0^\circ$

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7/10/73

AEDC(ARO-INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL R

NASA-PI ORBITER PEATING  
 VA2A9

GROUP CONFIG MODEL MACH NO ON(PSTA) TO(DEL P) ALPHA-MODEL ALPHA-SECTION ALPHA-PREPEND ROLL-MODEL YAW  
 170 7 CHESTER PA 7.59 601.6 1314 30.03 -0.03 -30.00 -180.00 -0.00  
 T-INF 0-INF 0-INF V-INF RHO-INF MU-INF HF/FT HREF STREF  
 (DEG R) (PSTA) (DEG F) (SLUGS/FT<sup>3</sup>) (LB-SEC/FT<sup>2</sup>) (BT-L) (R= .0175FT) (R= .0175FT)  
 95.4 .062 2.776 3625 5.662E-05 7.683E-08 2.719E 06 4.099E-02 2.450E-02  
 CAMERA ROLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHOXCAK) TRAR(TO) BETA(TO)  
 TOP(T) 7630 80  
 SIDE(S) 7496 350 .0550 0 0  
 MOTION(M) 7337

PIC NO TIME DELT TIME H(TO) H(TO)/HREF H(.910T) H(.910T)/HREF H(.912T) H(.912T)/HREF H(.912T)/HREF ST(TO)  
 M 7404(350) 1.15 MODEL HAS NOT REACHED CENTERLINE H(TO) HREF H(.910T) H(.910T)/HREF H(.912T) H(.912T)/HREF H(.912T)/HREF ST(TO)  
 T 1443(350) 1.18 MODEL HAS NOT REACHED CENTERLINE  
 S 5191(350) 1.18 MODEL HAS NOT REACHED CENTERLINE  
 T 1450(350) 2.23 MODEL HAS NOT REACHED CENTERLINE  
 S 5191(350) 2.23 MODEL HAS NOT REACHED CENTERLINE  
 M 7404(350) 2.23 MODEL HAS NOT REACHED CENTERLINE  
 INJECT TIME = 2.30  
 M 7410(350) 3.28 DATA NOT YET VALID  
 T 1451(350) 3.30 DATA NOT YET VALID  
 S 5142(350) 3.30 DATA NOT YET VALID  
 T 1454(350) 4.36 3.04 1.304E-02 .3327 1.803E-02 .4308 1.733E-02 .4227 8.047E-03  
 S 5191(350) 4.36 3.04 1.304E-02 .3327 1.803E-02 .4308 1.733E-02 .4227 8.047E-03  
 M 7411(350) 4.36 3.04 1.304E-02 .3327 1.803E-02 .4308 1.733E-02 .4227 8.047E-03  
 T 1453(350) 5.41 4.11 1.177E-02 .2471 1.554E-02 .3704 1.494E-02 .3647 6.942E-03  
 M 7412(350) 5.41 4.11 1.177E-02 .2471 1.554E-02 .3704 1.494E-02 .3647 6.942E-03  
 S 5144(350) 5.41 4.11 1.174E-02 .2462 1.551E-02 .3703 1.491E-02 .3636 6.922E-03  
 M 7413(350) 6.46 5.14 1.041E-02 .2562 1.305E-02 .3378 1.332E-02 .3254 6.194E-03  
 T 1454(350) 6.46 5.14 1.041E-02 .2562 1.305E-02 .3378 1.332E-02 .3254 6.194E-03  
 S 5145(350) 6.46 5.14 1.044E-02 .2554 1.305E-02 .3378 1.332E-02 .3247 6.181E-03  
 M 7414(350) 6.46 5.14 1.044E-02 .2554 1.305E-02 .3378 1.332E-02 .3247 6.181E-03  
 T 1455(350) 7.53 6.24 9.557E-03 .2131 1.243E-02 .3041 1.214E-02 .2961 5.636E-03  
 S 5196(350) 7.53 6.24 9.557E-03 .2131 1.243E-02 .3041 1.214E-02 .2961 5.636E-03  
 M 7415(350) 7.53 6.24 9.557E-03 .2131 1.243E-02 .3041 1.214E-02 .2961 5.636E-03  
 T 1456(350) 8.58 7.29 8.842E-03 .2156 1.144E-02 .2950 1.123E-02 .2739 5.214E-03  
 M 7416(350) 8.58 7.29 8.842E-03 .2156 1.144E-02 .2950 1.123E-02 .2739 5.214E-03  
 S 5197(350) 8.61 7.32 8.844E-03 .2152 1.147E-02 .2945 1.121E-02 .2734 5.205E-03  
 T 1457(350) 9.66 8.37 8.243E-03 .2013 1.091E-02 .2660 1.049E-02 .2557 4.867E-03  
 S 5146(350) 9.66 8.37 8.243E-03 .2013 1.091E-02 .2660 1.049E-02 .2557 4.867E-03  
 M 7417(350) 9.66 8.37 8.243E-03 .2013 1.091E-02 .2660 1.049E-02 .2557 4.867E-03

464

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7/10/73

NASA-RI ORBITER HEATING

AEDC(AMC, INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL R

VA299

GROUP CONFIG MODEL MACH NO POI(PST) TO(DEC R) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREBEND ROLL-MODEL YAW  
 129 7 ORBITER R4 7.99 602.0 1314 30.03 -0.0 -30.00 -180.00 --0.00

T-INF P-INF Q-INF V-INF QMO-INF MU-INF HREF HF/FT SREF  
 (DEC R) (PST) (FT/SEC) (SLUGS/FT<sup>2</sup>) (LH-SEC/FT<sup>2</sup>) (FT-1) (H=-0.175EI) (H=0.175EI)  
 92.4 .062 2.778 3825 5.445E-05 7.694E-04 2.720E 04 4.101E-02 2.489E-02

CAMERA ROLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHOACAK) TRAR(ITO) BETA(ITO)  
 TOP(T) 7630 80  
 SIDE(S) 7496 .0550  
 BOTTOM(B) 7337 3.489E-01 4.3410E-01

PIC NO	TIME DELTIME	H(ITO)	M(ITO)/HREF	M(.910)	M(.910)/HREF	M(.912TO)	M(.912TO)/HREF	ST(ITO)
T 145H(150)	10.71	9.42	1.097	1.024E-02	.250A	9.883E-03	.2411	4.500E-03
S 5194(150)	10.71	9.42	1.097	1.024E-02	.250A	9.883E-03	.2411	4.500E-03
M 7417(150)	10.71	9.42	1.097	1.024E-02	.250A	9.883E-03	.2411	4.500E-03
M 741H(150)	11.76	10.47	1.199	9.753E-03	.2378	9.374E-03	.2286	4.350E-03
T 1454(150)	11.79	10.50	1.197	9.741E-03	.2375	9.363E-03	.2283	4.346E-03
S 5201(150)	11.79	10.50	1.197	9.741E-03	.2375	9.363E-03	.2283	4.346E-03
T 1460(150)	12.84	11.56	1.112	9.204E-03	.2264	8.927E-03	.2176	4.142E-03
S 5203(150)	12.84	11.56	1.113	9.204E-03	.2264	8.927E-03	.2176	4.142E-03
M 7414(150)	12.84	11.56	1.113	9.204E-03	.2264	8.927E-03	.2176	4.142E-03
T 1461(150)	13.49	12.60	1.140	8.891E-03	.2168	8.546E-03	.2084	3.966E-03
M 7428(150)	13.89	12.60	1.140	8.891E-03	.2168	8.546E-03	.2084	3.966E-03
S 5202(150)	13.82	12.62	1.139	8.891E-03	.2166	8.534E-03	.2082	3.962E-03
T 1462(150)	14.54	13.65	1.155	8.542E-03	.2182	8.210E-03	.2001	3.809E-03
S 5203(150)	14.54	13.65	1.155	8.542E-03	.2182	8.210E-03	.2001	3.809E-03
M 7421(150)	14.57	13.67	1.154	8.534E-03	.2181	8.203E-03	.2000	3.807E-03
T 1463(150)	16.02	14.73	1.117	8.222E-03	.2105	7.905E-03	.1928	3.669E-03
S 5204(150)	16.02	14.73	1.117	8.222E-03	.2105	7.905E-03	.1928	3.669E-03
M 7422(150)	16.02	14.73	1.117	8.222E-03	.2105	7.905E-03	.1928	3.669E-03
T 1464(150)	17.07	15.78	1.166	7.845E-03	.1937	7.637E-03	.1862	3.544E-03
S 5205(150)	17.09	15.80	1.166	7.839E-03	.1936	7.631E-03	.1861	3.542E-03
M 7423(150)	17.09	15.80	1.166	7.839E-03	.1936	7.631E-03	.1861	3.542E-03
T 1465(150)	18.15	16.95	1.118	7.687E-03	.1874	7.389E-03	.1801	3.428E-03
S 5206(150)	18.15	16.95	1.118	7.687E-03	.1874	7.389E-03	.1801	3.428E-03
M 7424(150)	18.15	16.95	1.118	7.687E-03	.1874	7.389E-03	.1801	3.428E-03
T 1466(150)	19.20	17.90	1.174	7.454E-03	.1818	7.169E-03	.1748	3.326E-03
S 5207(150)	19.20	17.90	1.174	7.454E-03	.1818	7.169E-03	.1748	3.326E-03
M 7425(150)	19.20	17.90	1.174	7.454E-03	.1818	7.169E-03	.1748	3.326E-03

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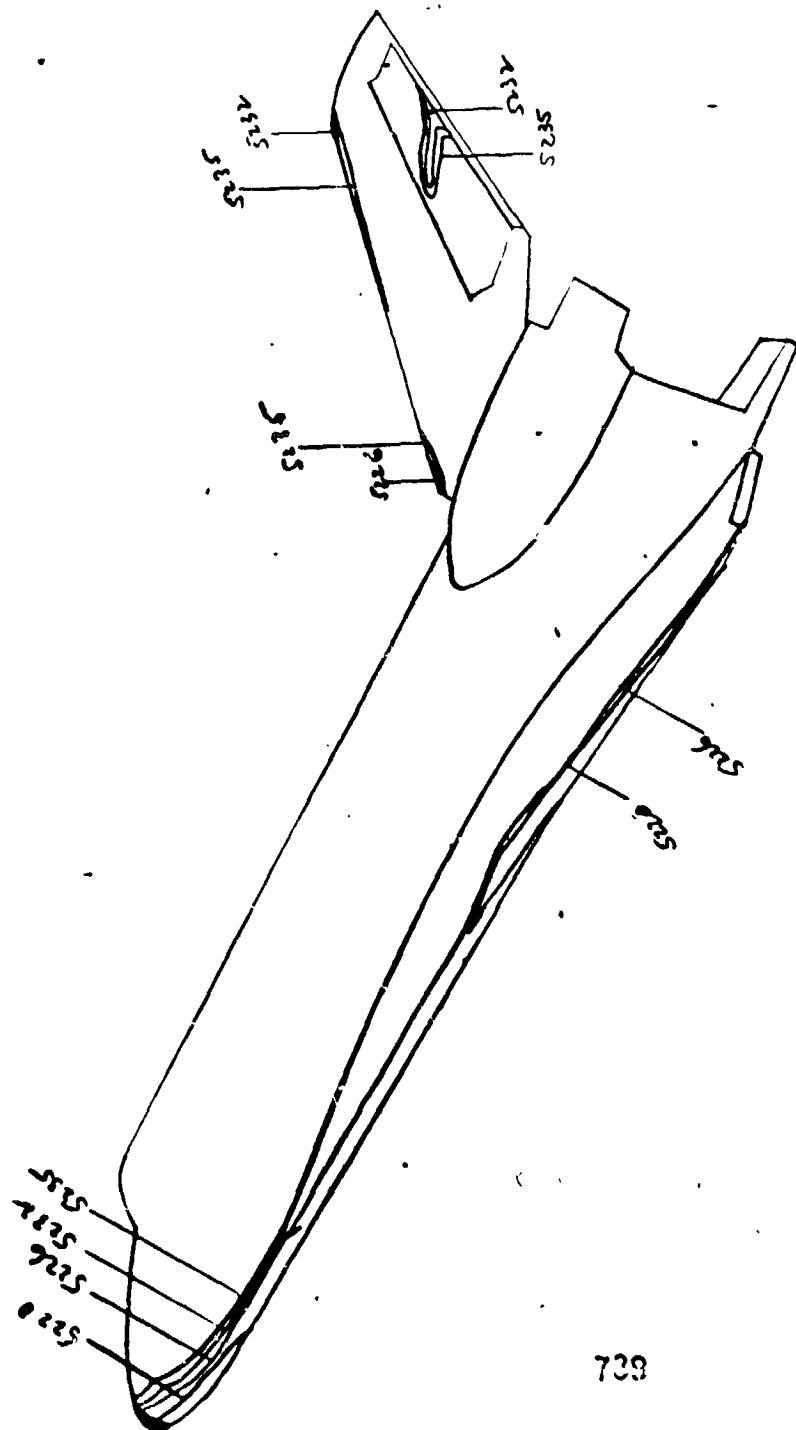


Figure 158





EDC(ARO,INC.) ARNOLD AFS, TENNESSEE  
VON KARMAN GAS DYNAMICS FACILITY  
50 INCH HYPERSONIC TUNNEL W

NASA-RI CRITTER HEATING

VA2R9

11/10/73

GROUP CONFID MODEL MACH NO CRITERIA T0(DEC R) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREPEND ROLL-MODEL YAW

121 4 7.99 598.8 1319 20.03 -.03 -30.00 -180.00 -.00

T-INF P-INF U-INF V-INF RHO-INF MU-INF RE/FT MREF STREF

(DEG R) (PSIA) (FT/SEC) (SLUGS/FT3) (LBS-SEC/FT2) (E-I-1) (E-I-1) (E-I-1) (E-I-1) (E-I-1) (E-I-1)

95.8 .062 2.763 3832 5.415E-05 7.713E-08 2.491E 06 4.003E-02 2.481E-02

CAMERA ROLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (HHOXCCK) TRAR(TO) RETA(TO)

TOP(T) 7830

51.5(S) 7496

WOTOM(R) 7.27

250 .0535 2.182E-01 2.3480E-01

PIC NO	TIME RELTIME	M(TO)	MREF	M(910)	M(910)/MREF	M(912TO)	M(912TO)/MREF	ST(TO)
T 1482(1250)	9.69	4.332E-03	.1058	5.463E-03	.1335	5.291E-03	.1293	2.586E-03
S 5223(1250)	9.69	4.332E-03	.1058	5.463E-03	.1335	5.291E-03	.1293	2.586E-03
T 1483(1250)	10.74	4.045E-03	.0998	5.151E-03	.1258	4.988E-03	.1219	2.439E-03
S 5224(1250)	10.74	4.045E-03	.0998	5.151E-03	.1258	4.988E-03	.1219	2.439E-03
T 1484(1250)	11.79	3.875E-03	.0947	4.846E-03	.1194	4.732E-03	.1157	2.314E-03
S 5225(1250)	11.79	3.875E-03	.0947	4.846E-03	.1194	4.732E-03	.1157	2.314E-03
T 1485(1250)	12.84	3.670E-03	.0896	4.640E-03	.1143	4.527E-03	.1102	2.204E-03
S 5226(1250)	12.84	3.670E-03	.0896	4.640E-03	.1143	4.527E-03	.1102	2.204E-03
T 1486(1250)	13.89	3.464E-03	.0845	4.434E-03	.1093	4.311E-03	.1053	2.106E-03
S 5227(1250)	13.89	3.464E-03	.0845	4.434E-03	.1093	4.311E-03	.1053	2.106E-03
T 1487(1250)	14.94	3.258E-03	.0794	4.227E-03	.1045	4.143E-03	.1012	2.044E-03
S 5228(1250)	14.94	3.258E-03	.0794	4.227E-03	.1045	4.143E-03	.1012	2.044E-03
T 1488(1250)	15.99	3.052E-03	.0743	4.021E-03	.1007	3.943E-03	.0976	1.952E-03
S 5229(1250)	15.99	3.052E-03	.0743	4.021E-03	.1007	3.943E-03	.0976	1.952E-03
T 1489(1250)	17.04	2.846E-03	.0692	3.815E-03	.0972	3.735E-03	.0942	1.883E-03
S 5230(1250)	17.04	2.846E-03	.0692	3.815E-03	.0972	3.735E-03	.0942	1.883E-03
T 1490(1250)	18.09	2.640E-03	.0641	3.609E-03	.0941	3.530E-03	.0911	1.823E-03
S 5231(1250)	18.09	2.640E-03	.0641	3.609E-03	.0941	3.530E-03	.0911	1.823E-03

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VAZRA

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7/10/73

GROUP	CONF	MODEL	MACH NO	PO(PSIA)	TO(DEG R)	ALPHA-MODEL	ALPHA-SECTION	ALPHA-PREHEND	ROLL-MODEL	YAW
121	4	ORBITER #1	7.99	599.0	1319	30-03	-03	-30.00	-180.00	-0.00

T-INF	P-INF	O-INF	V-INF	RMN-INF	MU-INF	RF/FT	MREF	STREF
(DEF P)	(PSIA)	(PSIA)	(F/SEC)	(SLUGS/FI3)	(LH-SEC/FI2)	(FI-1)	(R=-.0175FI)	(H=-.0125FI)
Q-C	.062	2.744	1637	5.619E-05	7.712E-04	2.692E-04	4.093E-02	2.480E-02

CANF-A	ROLL NO	PAINT TEMP (DEG F)	INITIAL TEMP (DEG F)	SQUARE FOOT (HMOACXK)	TRAW(TO)	BETA(TO)
1	1	100	100	100	100	100
2	2	100	100	100	100	100
3	3	100	100	100	100	100
4	4	100	100	100	100	100
5	5	100	100	100	100	100
6	6	100	100	100	100	100
7	7	100	100	100	100	100
8	8	100	100	100	100	100
9	9	100	100	100	100	100
10	10	100	100	100	100	100
11	11	100	100	100	100	100
12	12	100	100	100	100	100
13	13	100	100	100	100	100
14	14	100	100	100	100	100
15	15	100	100	100	100	100
16	16	100	100	100	100	100
17	17	100	100	100	100	100
18	18	100	100	100	100	100
19	19	100	100	100	100	100
20	20	100	100	100	100	100
21	21	100	100	100	100	100
22	22	100	100	100	100	100
23	23	100	100	100	100	100
24	24	100	100	100	100	100
25	25	100	100	100	100	100
26	26	100	100	100	100	100
27	27	100	100	100	100	100
28	28	100	100	100	100	100
29	29	100	100	100	100	100
30	30	100	100	100	100	100
31	31	100	100	100	100	100
32	32	100	100	100	100	100
33	33	100	100	100	100	100
34	34	100	100	100	100	100
35	35	100	100	100	100	100
36	36	100	100	100	100	100
37	37	100	100	100	100	100
38	38	100	100	100	100	100
39	39	100	100	100	100	100
40	40	100	100	100	100	100
41	41	100	100	100	100	100
42	42	100	100	100	100	100
43	43	100	100	100	100	100
44	44	100	100	100	100	100
45	45	100	100	100	100	100
46	46	100	100	100	100	100
47	47	100	100	100	100	100
48	48	100	100	100	100	100
49	49	100	100	100	100	100
50	50	100	100	100	100	100
51	51	100	100	100	100	100
52	52	100	100	100	100	100
53	53	100	100	100	100	100
54	54	100	100	100	100	100
55	55	100	100	100	100	100
56	56	100	100	100	100	100
57	57	100	100	100	100	100
58	58	100	100	100	100	100
59	59	100	100	100	100	100

TOP(1)	7830	AD	2.142E-01	2.3480E-01
SICF(S)	7496	250	.0535	

PIC NO	TIME	DELTIME	W(TO)	M(TO)/MREF	M(.910)	M(.9101)/MREF	M(.91210)	M(.912101)/MREF	ST(TO)
I	149112501	19.25	17.97	2.963E-03	.0724	.4913	3.619E-03	.0044	1.768E-03
M	7450112501	19.25	17.97	2.963E-03	.0724	.4913	3.619E-03	.0044	1.768E-03
S	5231212501	19.25	17.98	2.963E-03	.0723	.4912	3.617E-03	.0043	1.766E-03
I	1492112501	20.32	14.04	2.819E-03	.0703	.0046	3.515E-03	.0059	1.717E-03
S	5233112501	20.32	14.04	2.819E-03	.0703	.0046	3.515E-03	.0059	1.717E-03
M	7451112501	20.32	14.04	2.819E-03	.0703	.0046	3.515E-03	.0059	1.717E-03
I	1493112501	21.37	20.17	2.802E-03	.0684	.0043	3.422E-03	.0036	1.671E-03
M	7453112501	21.37	20.17	2.802E-03	.0684	.0043	3.422E-03	.0036	1.671E-03
S	5234112501	21.40	20.12	2.802E-03	.0684	.0043	3.420E-03	.0035	1.670E-03
I	1494112501	23.03	21.75	2.644E-03	.0654	.0040	3.290E-03	.0030	1.606E-03
M	7454112501	23.03	21.75	2.644E-03	.0654	.0040	3.290E-03	.0030	1.606E-03
S	5235112501	23.03	21.75	2.644E-03	.0654	.0040	3.270E-03	.0030	1.606E-03
MODEL WAS LEFT CENTERLINE									
I	1495112501	23.03	23.75	2.519E-03	.0610	.0704	3.148E-03	.0769	1.537E-03
M	7455112501	23.03	23.75	2.519E-03	.0610	.0704	3.142E-03	.0769	1.537E-03
S	5236112501	23.05	23.78	2.519E-03	.0629	.0793	3.146E-03	.0769	1.537E-03
M	7455112501	24.04	25.70	2.474E-03	.0604	.0762	3.022E-03	.0738	1.475E-03
I	1496112501	24.08	25.80	2.473E-03	.0604	.0762	3.020E-03	.0777	1.475E-03
S	5237112501	24.08	25.80	2.473E-03	.0604	.0762	3.020E-03	.0738	1.475E-03

7496  
64 122-  
CWC

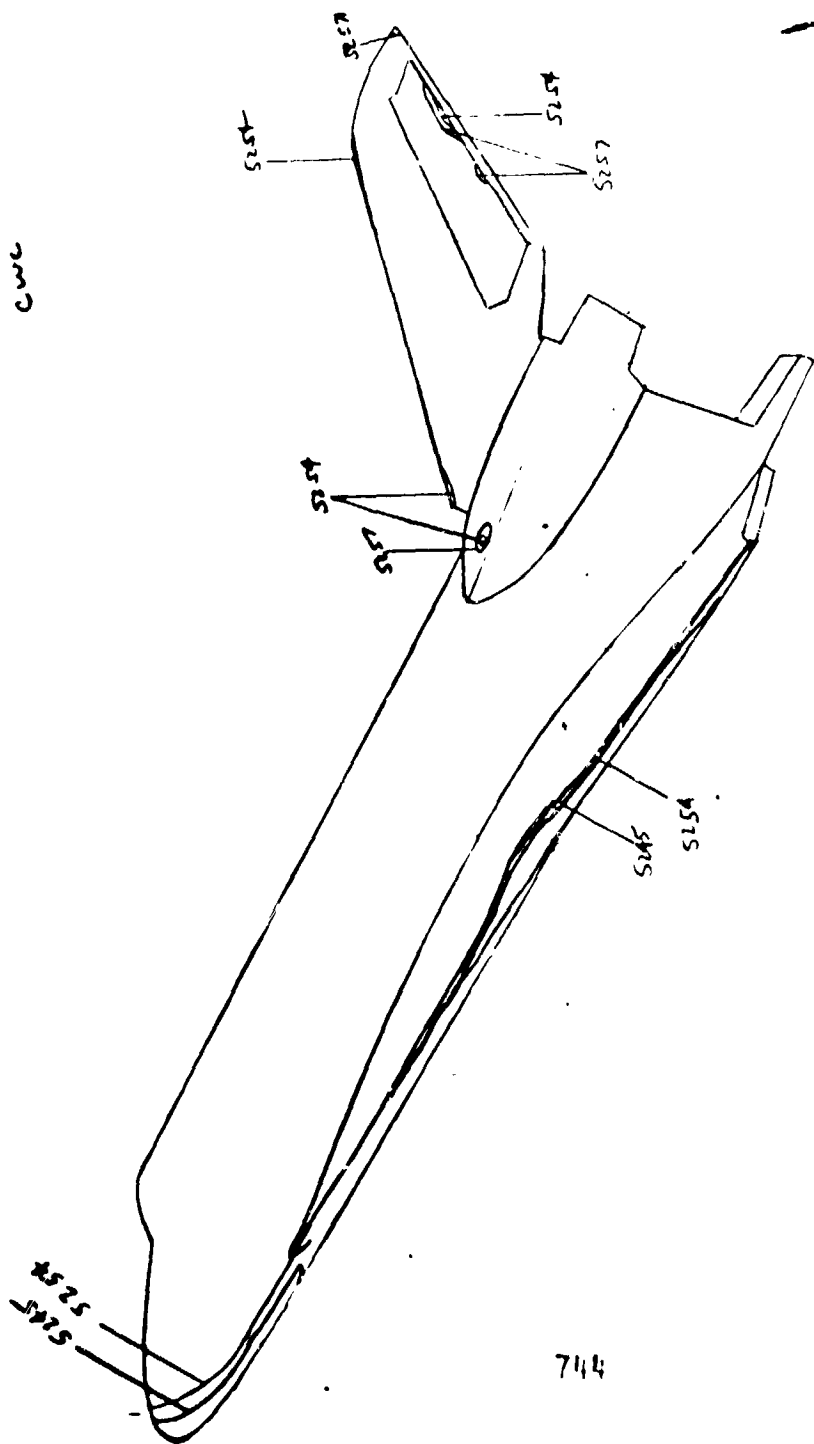
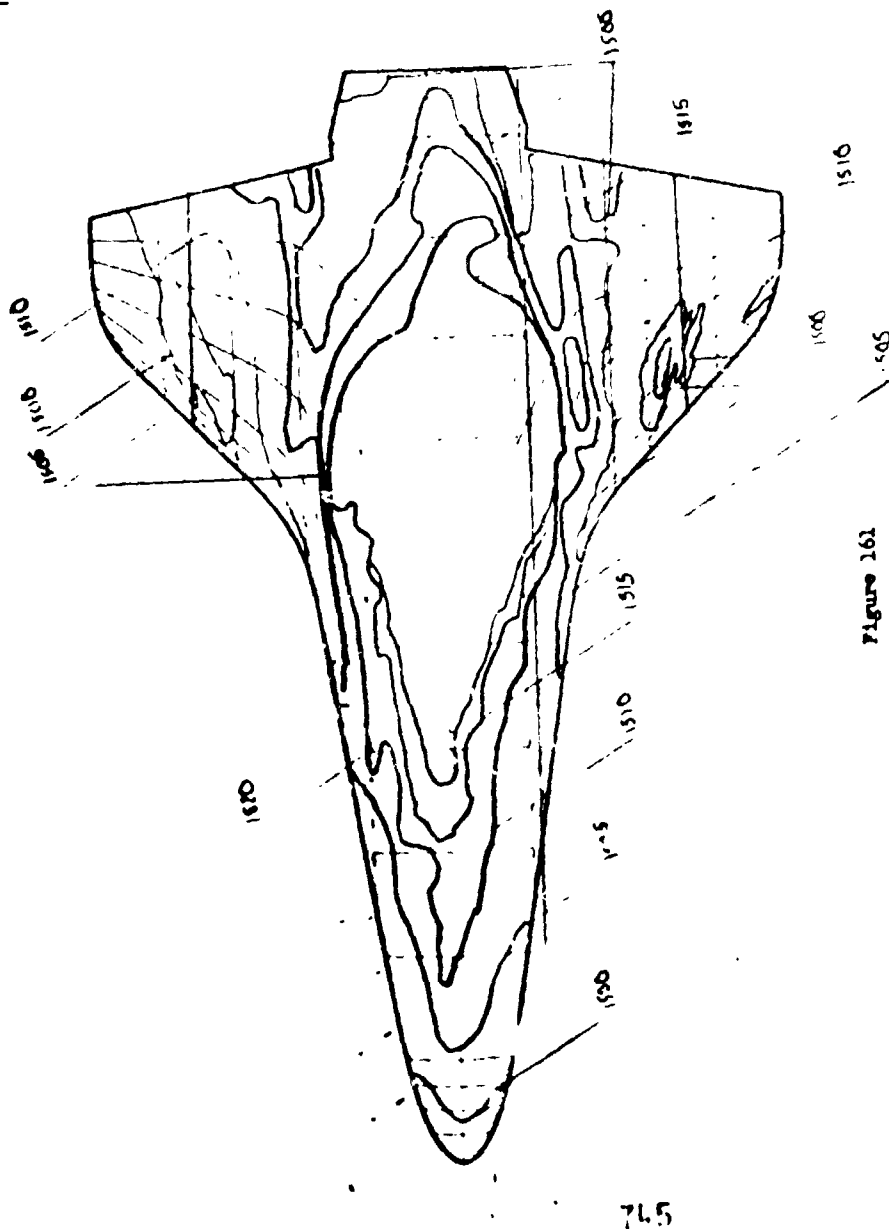


Figure 160

Group 122  
7830  
WDC



8585  
 $\alpha = 30^\circ$   
 $\phi = 0^\circ$

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7/16/73

NASA-RI ORBITER HEATING AEDC (ARO-INC.) ARNOLD AFS, TENNESSEE  
VON KARMAN GAS DYNAMICS FACILITY  
50 INCH HYPERSONIC TUNNEL R

VA289

GROUP	CONFID	MODEL	MACH NO	PO (PSIA)	TO (DEG R)	ALPHA-MODEL	ALPHA-SECTION	ALPHA-PREBEND	ROLL-MODEL	YAW
122	2	ORBITER S	7.99	597.8	1318	30.03	-0.03	-30.00	-180.00	-0.00
T-1NF	P-1NF	Q-1NF	V-1NF	RHO-1NF	MU-1NF	HF/FT	HREF	STREF		
(DEG R)	(PSIA)	(FT/SEC)	(SLUGS/FT <sup>3</sup> )	(LB-SEC/FT <sup>3</sup> )	(FT-1)					
5.7	0.62	2.759	3830	5.412E-05	7.705F-08	2.690E-04	4.089E-02	2.481E-02		

CAMERA

TOP (I)	ROLL NO	PAINT IFMP (DEG F)	INITIAL TEMP (DEG F)	SQUARE ROOT (RMOACXK)	TRAR (TO)	BETA (TO)
7230			79	0.0535	0	0
SIDE (S)		250				
MOTICM (R)		7237				

PIC NO	TIME DELTIME	H (TO)	H (TO)/HREF	H (TO)/HREF	H (TO)/HREF	H (TO)/HREF	H (TO)/HREF	H (TO)/HREF	H (TO)/HREF	H (TO)/HREF
T 1497 (250)	1.18	MODEL HAS NOT REACHED CENTERLINE	9.127E-03	0.232	8.839E-03	0.2162	4.324E-03			
S 5238 (250)	1.18	MODEL HAS NOT REACHED CENTERLINE	9.127E-03	0.232	8.839E-03	0.2162	4.324E-03			
M 7450 (250)	1.18	MODEL HAS NOT REACHED CENTERLINE	9.127E-03	0.232	8.839E-03	0.2162	4.324E-03			
T 1497 (250)	2.23	MODEL HAS NOT REACHED CENTERLINE	7.875E-03	0.1925	7.626E-03	0.1864	3.728E-03			
M 7450 (250)	2.23	MODEL HAS NOT REACHED CENTERLINE	7.875E-03	0.1925	7.626E-03	0.1864	3.728E-03			
S 5239 (250)	2.25	MODEL HAS NOT REACHED CENTERLINE	7.875E-03	0.1925	7.626E-03	0.1864	3.728E-03			
INJECT TIME = 2.30										
T 1497 (250)	3.30	DATA NOT YET VALID	7.875E-03	0.1920	7.626E-03	0.1859	3.717E-03			
S 5240 (250)	3.30	DATA NOT YET VALID	7.875E-03	0.1920	7.626E-03	0.1859	3.717E-03			
M 7451 (250)	3.30	DATA NOT YET VALID	7.875E-03	0.1920	7.626E-03	0.1859	3.717E-03			
T 1497 (250)	4.36	7.236E-03	0.1770	0.232	8.839E-03	0.2162	4.324E-03			
S 5238 (250)	4.36	7.236E-03	0.1770	0.232	8.839E-03	0.2162	4.324E-03			
M 7450 (250)	4.36	7.236E-03	0.1770	0.232	8.839E-03	0.2162	4.324E-03			
T 1497 (250)	5.41	6.244E-03	0.1526	0.1925	7.626E-03	0.1864	3.728E-03			
M 7450 (250)	5.41	6.244E-03	0.1526	0.1925	7.626E-03	0.1864	3.728E-03			
S 5239 (250)	5.43	6.244E-03	0.1526	0.1925	7.626E-03	0.1864	3.728E-03			
T 1497 (250)	6.46	5.572E-03	0.1362	0.1718	6.800E-03	0.1664	3.321E-03			
S 5238 (250)	6.46	5.572E-03	0.1362	0.1718	6.800E-03	0.1664	3.321E-03			
M 7450 (250)	6.48	5.572E-03	0.1362	0.1718	6.800E-03	0.1664	3.321E-03			
T 1497 (250)	7.53	5.049E-03	0.1239	0.1543	6.191E-03	0.1514	3.027E-03			
S 5239 (250)	7.53	5.049E-03	0.1239	0.1543	6.191E-03	0.1514	3.027E-03			
M 7450 (250)	7.53	5.049E-03	0.1239	0.1543	6.191E-03	0.1514	3.027E-03			
T 1497 (250)	8.58	4.641E-03	0.1146	0.1446	5.724E-03	0.1400	2.800E-03			
S 5238 (250)	8.58	4.641E-03	0.1146	0.1446	5.724E-03	0.1400	2.800E-03			
M 7450 (250)	8.61	4.641E-03	0.1146	0.1446	5.724E-03	0.1400	2.800E-03			
T 1497 (250)	9.66	4.377E-03	0.1070	0.1350	5.347E-03	0.1307	2.614E-03			
S 5239 (250)	9.66	4.377E-03	0.1070	0.1350	5.347E-03	0.1307	2.614E-03			
M 7450 (250)	9.66	4.377E-03	0.1070	0.1350	5.347E-03	0.1307	2.614E-03			

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 • UNCLASSIFIED •  
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7/10/73

NASA-RI ORBITER HEATING

VA2R9

AECG(AHO+TAC.) ARNOLD AFS, TENNESSEE  
VON KARMAN GAS DYNAMICS FACILITY  
50 INCH HYPERSONIC TUNNEL H

GROUP CONFID MODEL MACH NO PO(PISA) TO(DES R) ALPHA-MODEL ALPHA-SECTION ALPHA-PREBEND ROLL-MODEL YAW  
122 2 GREITER S 7.99 598.3 1318 30.03 -0.03 -30.00 -180.00 -0.00

T-INF P-INF Q-INF V-INF W-INF MU-INF RE/FT MREF STREF  
(OFG H) (PSIA) (PSIA) (FT/SEC) (SLUGS/FT3) (LBS-SEC/FT2) (FT-L) (R=.0175F) (R=.0175F)  
95.7 .062 2.761 3830 5.416E-05 7.705E-08 2.693E 06 4.090E-02 2.480E-02

CAMERA ROLL NO PAINT IFMP (DES F) INITIAL TEMP (DES F) SQUARE ROOT (RHO/CAC) TRAH(TO) BETA(TO)  
TOP(T) 7830 79  
SIDF(S) 7496  
MOTFM(R) 7337 0535 2.197E-01 2.3669E-01

PIC NO	TIME DELT	H(TO)	H(TO)/HREF	H(.9TO)/HREF	H(.912TO)	H(.912TO)/HREF	ST(TO)
T 1506(250)	10.71	9.42	4.126E-03	1.009	5.204E-03	.1272	2.463E-03
M 7465(250)	10.71	9.42	4.126E-03	1.009	5.204E-03	.1272	2.463E-03
S 5271(250)	10.74	9.44	4.120E-03	1.007	5.197E-03	.1271	2.460E-03
T 1507(250)	11.79	10.50	3.909E-03	.0956	4.930E-03	.1205	2.334E-03
M 7466(250)	11.79	10.50	3.909E-03	.0956	4.930E-03	.1205	2.334E-03
S 5244(250)	11.79	10.50	3.909E-03	.0956	4.930E-03	.1205	2.334E-03
T 1508(250)	12.84	11.55	3.727E-03	.0911	4.700E-03	.1149	2.225E-03
M 7467(250)	12.84	11.55	3.727E-03	.0911	4.700E-03	.1149	2.225E-03
S 5245(250)	12.84	11.55	3.727E-03	.0911	4.700E-03	.1149	2.225E-03
T 1509(250)	13.73	12.63	3.566E-03	.0872	4.500E-03	.1100	2.131E-03
M 7468(250)	13.73	12.63	3.566E-03	.0872	4.500E-03	.1100	2.131E-03
S 5250(250)	13.73	12.63	3.566E-03	.0872	4.500E-03	.1100	2.131E-03
T 1510(250)	14.57	13.67	3.424E-03	.0839	4.323E-03	.1057	2.046E-03
M 7469(250)	14.57	13.67	3.424E-03	.0839	4.323E-03	.1057	2.046E-03
S 5251(250)	14.57	13.67	3.424E-03	.0839	4.323E-03	.1057	2.046E-03
T 1511(250)	16.02	14.73	3.300E-03	.0807	4.162E-03	.1017	1.970E-03
M 7470(250)	16.02	14.73	3.300E-03	.0807	4.162E-03	.1017	1.970E-03
S 5252(250)	16.02	14.73	3.300E-03	.0807	4.162E-03	.1017	1.970E-03
T 1512(250)	17.09	15.78	3.146E-03	.0779	4.012E-03	.0983	1.903E-03
M 7471(250)	17.09	15.78	3.146E-03	.0779	4.012E-03	.0983	1.903E-03
S 5253(250)	17.09	15.78	3.146E-03	.0779	4.012E-03	.0983	1.903E-03
T 1513(250)	18.15	16.85	3.045E-03	.0754	3.891E-03	.0951	1.841E-03
M 7472(250)	18.15	16.85	3.045E-03	.0754	3.891E-03	.0951	1.841E-03
S 5254(250)	18.15	16.85	3.045E-03	.0754	3.891E-03	.0951	1.841E-03
T 1514(250)	19.20	17.90	2.943E-03	.0731	3.775E-03	.0923	1.786E-03
M 7473(250)	19.20	17.90	2.943E-03	.0731	3.775E-03	.0923	1.786E-03
S 5255(250)	19.20	17.90	2.943E-03	.0731	3.775E-03	.0923	1.786E-03

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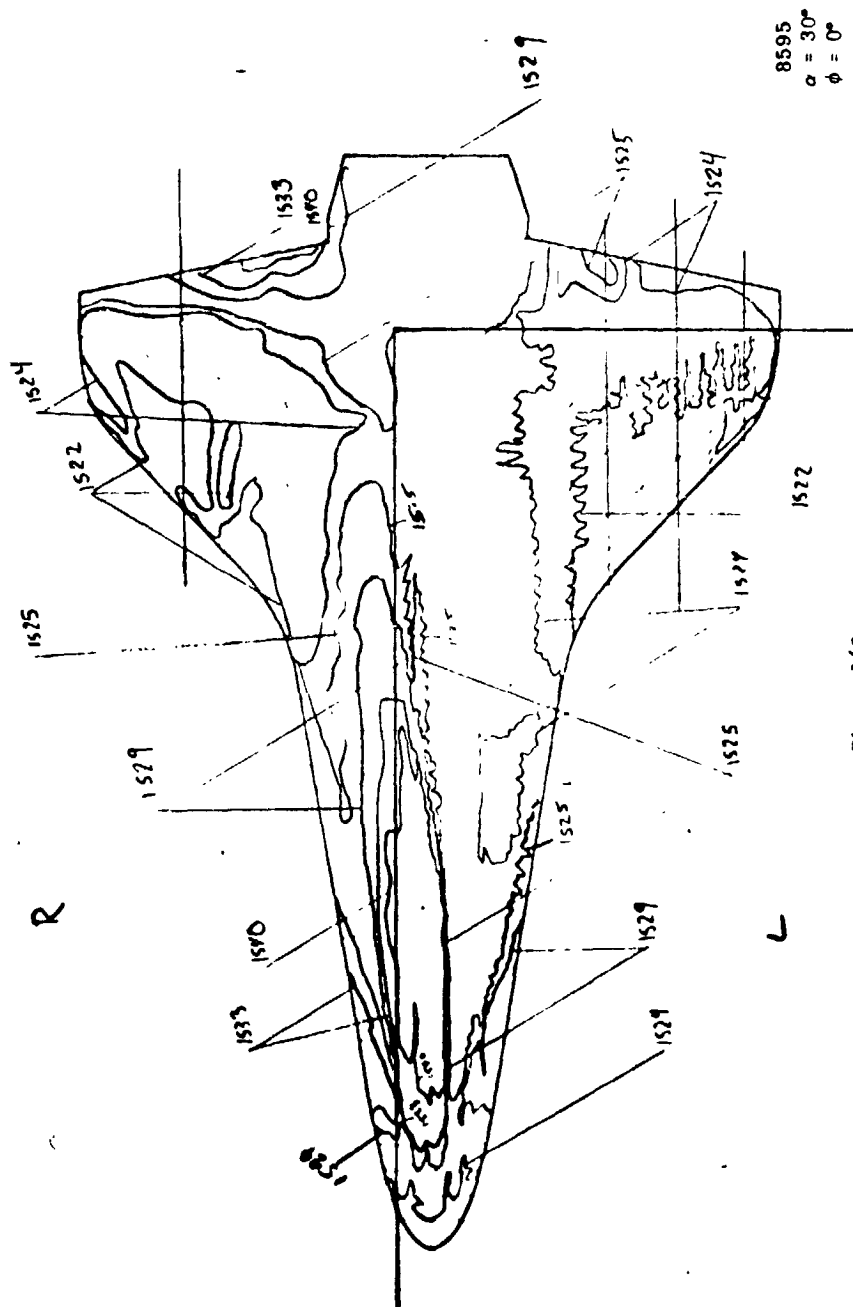
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 7/10/73

NASA-R1 ORBITER PEATINE AEDC(ARO, INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL R  
 VA249

GROUP CONFIG MODEL MACH NO PO(PISA) TO(DEF R) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREBEND ROLL-MODEL YAW  
 122 2 CRITERION 5 7.99 59R.8 1317 30.03 -.03 -30.00 -180.00 -.00  
 T-INF P-INF Q-INF M-INF RHO-INF MU-INF W/FI HREF STREF  
 (DEF R) (PISA) (PSIA) (FT/SEC) (SLUGS/FT<sup>3</sup>) (LBS-SEC/FT<sup>2</sup>) (FT-1) (R= .0175FT) (R= .0175FT)  
 95.7 .062 2.763 38.0 5.421E-05 7.704E-08 2.495E-06 4.092E-02 2.479E-02  
 CAMERA ROLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHO/CAL) TRAR(TO) BETA(TO)  
 TOP(T) 7830 79  
 SIDE(S) 7496  
 MOTION(R) 7337 .0535 2.197E-01 2.3669E-01

PIC NO TIME DELTME H(TO) H(TO)/HREF M(.910) M(.912TO)/HREF ST(TO)  
 T 1514(250) 19.22 17.93 .0731 3.772E-03 .0922 3.653E-03 .0903 1.785E-03  
 S 4255(250) 19.22 17.93 .0731 3.772E-03 .0922 3.653E-03 .0903 1.785E-03  
 T 1515(250) 20.27 17.93 .0710 3.666E-03 .0896 3.550E-03 .0868 1.734E-03  
 S 4256(250) 20.27 17.93 .0710 3.666E-03 .0896 3.550E-03 .0868 1.734E-03  
 M 7474(250) 20.27 17.93 .0710 3.666E-03 .0896 3.550E-03 .0868 1.734E-03  
 T 1516(250) 21.32 24.03 .0691 3.549E-03 .0872 3.456E-03 .0844 1.688E-03  
 S 4257(250) 21.32 24.03 .0691 3.549E-03 .0872 3.456E-03 .0844 1.688E-03  
 M 7475(250) 21.32 24.03 .0691 3.549E-03 .0872 3.456E-03 .0844 1.688E-03  
 T 1517(250) 22.38 21.08 .0674 3.479E-03 .0850 3.369E-03 .0823 1.646E-03  
 S 4258(250) 22.38 21.08 .0674 3.479E-03 .0850 3.369E-03 .0823 1.646E-03  
 M 7476(250) 22.38 21.11 .0674 3.479E-03 .0850 3.369E-03 .0823 1.646E-03  
 MODEL WAS LEFT CENTERLINE  
 T 1514(250) 24.13 22.84 .0644 3.342E-03 .0817 3.237E-03 .0791 1.581E-03  
 S 4255(250) 24.13 22.84 .0644 3.342E-03 .0817 3.237E-03 .0791 1.581E-03  
 M 7477(250) 24.13 22.84 .0644 3.342E-03 .0817 3.237E-03 .0791 1.581E-03  
 T 1514(250) 26.16 24.84 .0621 3.203E-03 .0783 3.102E-03 .0758 1.515E-03  
 S 4256(250) 26.16 24.84 .0621 3.203E-03 .0783 3.102E-03 .0758 1.515E-03  
 M 7474(250) 26.16 24.84 .0621 3.203E-03 .0783 3.102E-03 .0758 1.515E-03

Group 123  
7830  
MOV



8595  
 $\alpha = 30^\circ$   
 $\phi = 0^\circ$

Figure 162

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7/10/73

## NASA-RI ORBITER HEATING

AFDC(ARO,INC.) ARNOLD AFS, TENNESSEE  
VON KARMAN GAS DYNAMICS FACILITY  
50 INCH HYPERSONIC TUNNEL R

VA290

GROUP	CONFIG	MODEL	MACH NO	POISIA	TO(LEG R)	ALPHA-MODEL	ALPHA-SECTOR	ALPHA-PREBEND	ROLL-MODEL	YAW
123	4	ORBITER R3	7.99	598.1	1318	30.03	-0.03	-30.00	-180.00	-0.00
T-1AF	P-1NF	Q-1NF	V-1NF	RHO-1NF	WU-1NF	WF/FT	HREF	STREF		
(DEG R)	(PSIA)	(FT/SEC)	(SLUGS/FT <sup>3</sup> )	(LB-SEC/FT <sup>2</sup> )	(EI-1)	(R=)	(R=)	(R=)		
95.8	0.02	2.760	3031	5.411E-05	7.710E-08	2.489E-04	4.000E-02	2.482E-02		
CAMERA		HOLL NO	PAINT TEMP (DEG F)	INITIAL TEMP (DEG F)	SQUARE ROOT (RHOXCAK)	TRAR(ITO)	BETA(ITO)			
TOP(IT)		7830								
SIDE(S)		7496								
MOTICM(9)		7237								

0

0.0544

A1

PTC NO	TIME DELTIME	M(TO)	M(TO)/HREF	M(.91TO)	M(.91TO)/HREF	M(.912TO)	M(.912TO)/HREF	ST(ITO)
T 1520(100)	1.15	MODEL HAS NOT REACHED CENTERLINE						
M 7474(100)	1.15	MODEL HAS NOT REACHED CENTERLINE						
S 5261(100)	1.15	MODEL HAS NOT REACHED CENTERLINE						
T 1521(100)	2.23	MODEL HAS NOT REACHED CENTERLINE						
S 5262(100)	2.23	MODEL HAS NOT REACHED CENTERLINE						
M 7483(100)	2.23	MODEL HAS NOT REACHED CENTERLINE						
INJECT TIME =	2.28							
T 1522(100)	3.28	DATA NOT YET VALID						
M 7481(100)	3.28	DATA NOT YET VALID						
S 5263(100)	3.28	DATA NOT YET VALID						
T 1523(100)	4.33	1.04E-02	.2457	1.299E-02	.3175	1.254E-02	.3065	6.012E-03
M 7482(100)	4.33	1.04E-02	.2457	1.299E-02	.3175	1.254E-02	.3065	6.012E-03
S 5264(100)	4.33	1.04E-02	.2457	1.299E-02	.3175	1.254E-02	.3065	6.012E-03
T 1524(100)	5.41	1.04E-02	.2457	1.299E-02	.3175	1.254E-02	.3065	6.012E-03
S 5265(100)	5.41	1.04E-02	.2457	1.299E-02	.3175	1.254E-02	.3065	6.012E-03
M 7484(100)	5.41	1.04E-02	.2457	1.299E-02	.3175	1.254E-02	.3065	6.012E-03
T 1525(100)	6.48	1.04E-02	.2457	1.299E-02	.3175	1.254E-02	.3065	6.012E-03
S 5266(100)	6.48	1.04E-02	.2457	1.299E-02	.3175	1.254E-02	.3065	6.012E-03
M 7485(100)	6.48	1.04E-02	.2457	1.299E-02	.3175	1.254E-02	.3065	6.012E-03
T 1526(100)	7.51	1.04E-02	.2457	1.299E-02	.3175	1.254E-02	.3065	6.012E-03
S 5267(100)	7.51	1.04E-02	.2457	1.299E-02	.3175	1.254E-02	.3065	6.012E-03
M 7486(100)	7.51	1.04E-02	.2457	1.299E-02	.3175	1.254E-02	.3065	6.012E-03
T 1527(100)	8.58	1.04E-02	.2457	1.299E-02	.3175	1.254E-02	.3065	6.012E-03
S 5268(100)	8.58	1.04E-02	.2457	1.299E-02	.3175	1.254E-02	.3065	6.012E-03
M 7487(100)	8.58	1.04E-02	.2457	1.299E-02	.3175	1.254E-02	.3065	6.012E-03
T 1528(100)	9.64	1.04E-02	.2457	1.299E-02	.3175	1.254E-02	.3065	6.012E-03
S 5269(100)	9.64	1.04E-02	.2457	1.299E-02	.3175	1.254E-02	.3065	6.012E-03
M 7488(100)	9.64	1.04E-02	.2457	1.299E-02	.3175	1.254E-02	.3065	6.012E-03

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7/10/73

NASA-RT ORBITER HEATING  
 VA249  
 AFDC (AON, INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL W

GROUP CONFIG MODEL MACH NO POS(PST) TO( DEG R) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREBEND ROLL-MODEL VAW  
 123 6 ORBITER R3 7.99 59A.4 1314 30.03 -.03 -30.00 -180.00 -.00  
 T-1NF D-1NF O-1NF V-1NF MU-1NF RU-1NF W-1NF S-1NF  
 (DEG M) (PSIA) (FT/SEC) (SLUGS/FT<sup>3</sup>) (LB-SEC/FT<sup>2</sup>) (FT-1) (R= .0175FI) (M= .0175FI)  
 94.7 .062 2.761 3431 5.415E-05 7.708E-02 2.491E-02 2.481E-02  
 CAMERA ROLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RH0ACAN) TRAR(TO) BETA(TO)  
 104.1 7630  
 SING(3) 7494  
 MOTION(8) 7337  
 300 81 .0544 2.817E-01 3.2413E-01

PIC NO TIME DELTIME HITO)/HREF M(-910) M(-910)/HREF M(-9120) M(-9120)/HREF ST(TO)  
 T 1537(100) 19.17 17.89 4.148E-03 .1019 5.365E-03 .1311 5.179E-03 .1265 2.481E-03  
 M 7494(100) 19.17 17.89 4.148E-03 .1019 5.365E-03 .1311 5.179E-03 .1265 2.481E-03  
 S 5274(100) 19.20 17.92 4.165E-03 .1014 5.361E-03 .1310 5.175E-03 .1264 2.479E-03  
 T 1534(100) 20.25 18.97 4.044E-03 .0989 5.210E-03 .1273 5.030E-03 .1229 2.409E-03  
 M 7494(100) 20.25 18.97 4.044E-03 .0989 5.210E-03 .1273 5.030E-03 .1229 2.409E-03  
 S 5274(100) 21.30 20.02 3.941E-03 .0983 5.072E-03 .1239 4.896E-03 .1196 2.345E-03  
 T 1534(100) 21.30 20.02 3.941E-03 .0983 5.072E-03 .1239 4.896E-03 .1196 2.345E-03  
 M 7494(100) 21.30 20.02 3.941E-03 .0983 5.072E-03 .1239 4.896E-03 .1196 2.345E-03  
 S 5274(100) 22.35 21.07 3.641E-03 .0939 4.944E-03 .1208 4.772E-03 .1166 2.287E-03  
 T 1534(100) 22.35 21.07 3.641E-03 .0939 4.944E-03 .1208 4.772E-03 .1166 2.287E-03  
 M 7494(100) 22.35 21.07 3.641E-03 .0939 4.944E-03 .1208 4.772E-03 .1166 2.287E-03  
 S 5274(100) 22.35 21.07 3.641E-03 .0939 4.944E-03 .1208 4.772E-03 .1166 2.287E-03  
 MODEL HAS LEFT CENTERLINE  
 T 1534(100) 23.43 22.15 3.747E-03 .0915 4.822E-03 .1178 4.655E-03 .1137 2.230E-03  
 M 7494(100) 23.43 22.15 3.747E-03 .0915 4.822E-03 .1178 4.655E-03 .1137 2.230E-03  
 S 5274(100) 23.43 22.15 3.747E-03 .0915 4.822E-03 .1178 4.655E-03 .1137 2.230E-03  
 T 1534(100) 24.48 23.20 3.641E-03 .0944 4.712E-03 .1151 4.544E-03 .1111 2.179E-03  
 M 7494(100) 24.48 23.20 3.641E-03 .0944 4.712E-03 .1151 4.544E-03 .1111 2.179E-03  
 S 5274(100) 24.48 23.20 3.641E-03 .0944 4.712E-03 .1151 4.544E-03 .1111 2.179E-03

475

752

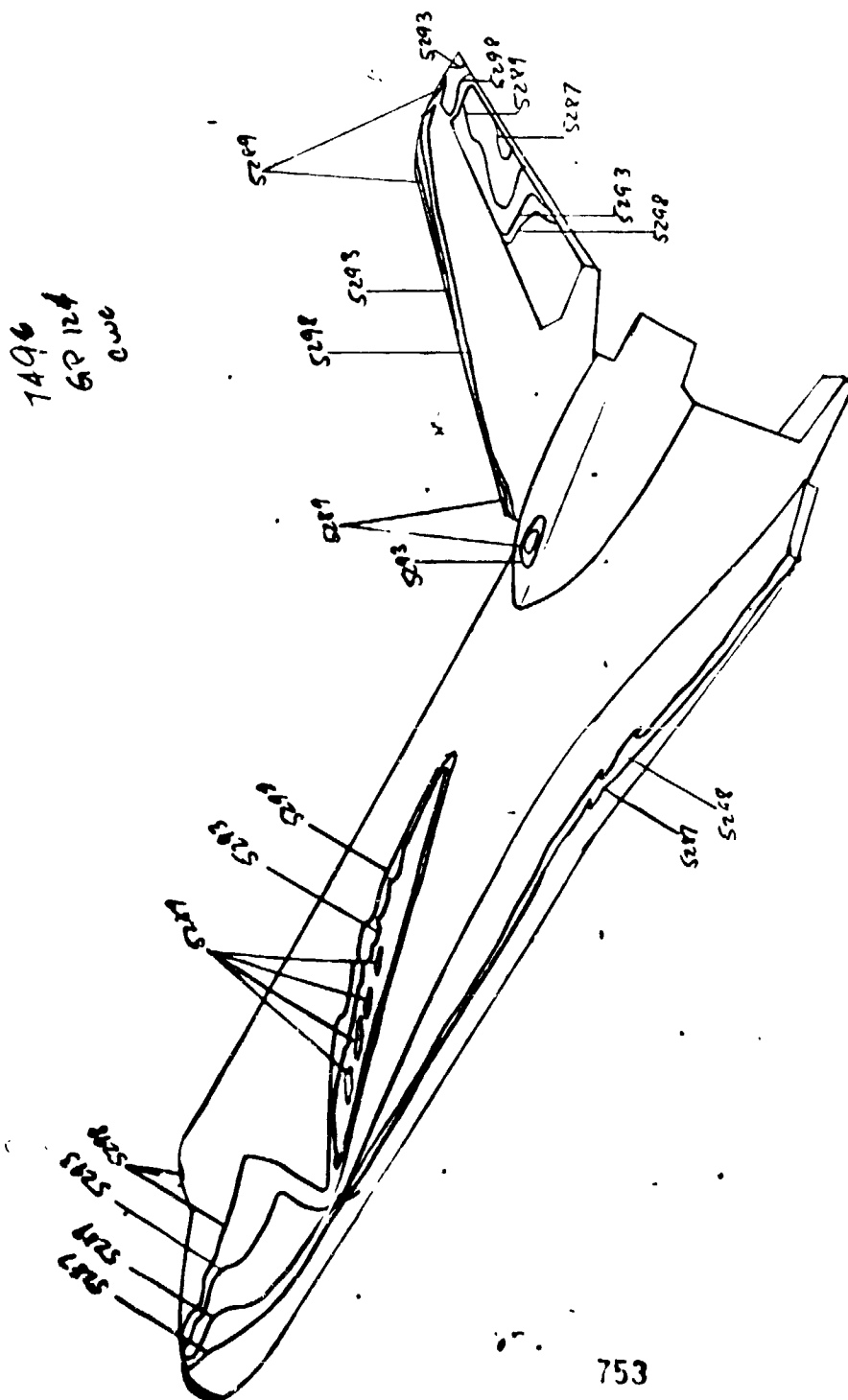


Figure 163





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7/10/73

NASA-MI ORBITER HEATING

AFDC (AHO, INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL R

VA280

GROUP	CONFIG	MODEL	MACH NO	PO (PSIA)	TO (DEG F)	ALPHA-MODEL	ALPHA-SECTION	ALPHA-PREBEND	ROLL-MODEL	YAW
124	2	ORBITER S	7.99	600.2	1321	30.03	-0.03	-30.00	-180.00	-0.00
T-1NF	P-1NF	Q-1NF	V-1NF	RHO-1NF	MU-1NF	HF/FT	HREF	SINEF		
(DEG R)	(PSIA)	(PSIA)	(FT/SEC)	(SLUGS/FT <sup>3</sup> )	(LB-SEC/FT <sup>2</sup> )	(FT-1)	(R= .0175E1)	(H= .0175E1)		
95.9	.062	2.770	3835	5.419E-04	7.725E-04	2.690E-06	4.009E-02	2.440E-02		
CAMERA	ROLL NO	PAINT IFUP	(DEG F)	INITIAL TEMP	(DEG F)	SQUARE ROOT	'HMOXCKX)	TRAN (TO)	BETA (TO)	
TOP (T)	7630			80		.0486		0	0	
SIDE (S)	7496	131								
MOLICH (M)	7237									

PIC NO	TIME DELT	M (TO)	M (TO)/HREF	M (-910)	M (-910)/HREF	M (-912 TO)	M (-912 TO)/HREF	ST (TO)
T 1643 (131)	1.18	MODEL WAS NOT REACHED CENTERLINE						
S 5245 (131)	1.18	MODEL WAS NOT REACHED CENTERLINE						
M 7502 (131)	1.18	MODEL WAS NOT REACHED CENTERLINE						
T 1644 (131)	2.25	MODEL WAS NOT REACHED CENTERLINE						
S 5245 (131)	2.25	MODEL WAS NOT REACHED CENTERLINE						
M 7503 (131)	2.25	MODEL WAS NOT REACHED CENTERLINE						
INJECT TIME =	2.30							
T 1645 (131)	3.30	DATA NOT YET VALID						
S 5246 (131)	3.30	DATA NOT YET VALID						
M 7504 (131)	3.30	DATA NOT YET VALID						
T 1646 (131)	4.36	1.645E-03	.0113	2.044E-03	.0543	2.008E-03	.0490	1.016E-03
S 5247 (131)	4.36	1.645E-03	.0413	2.044E-03	.0543	2.008E-03	.0490	1.016E-03
M 7505 (131)	4.36	1.645E-03	.0412	2.044E-03	.0543	2.008E-03	.0490	1.016E-03
T 1647 (131)	5.43	1.445E-03	.0352	1.775E-03	.0433	1.727E-03	.0421	8.741E-04
S 5248 (131)	5.43	1.445E-03	.0355	1.775E-03	.0433	1.727E-03	.0421	8.741E-04
M 7506 (131)	5.43	1.445E-03	.0356	1.775E-03	.0433	1.727E-03	.0421	8.741E-04
T 1648 (131)	6.48	1.372E-03	.0317	1.545E-03	.0386	1.542E-03	.0376	7.758E-04
S 5249 (131)	6.48	1.372E-03	.0317	1.545E-03	.0386	1.542E-03	.0376	7.758E-04
M 7507 (131)	6.48	1.372E-03	.0317	1.545E-03	.0386	1.542E-03	.0376	7.758E-04
T 1649 (131)	7.56	1.244E-03	.0271	1.445E-03	.0352	1.404E-03	.0342	7.110E-04
S 5250 (131)	7.56	1.244E-03	.0271	1.445E-03	.0352	1.404E-03	.0342	7.110E-04
M 7508 (131)	7.56	1.244E-03	.0271	1.445E-03	.0352	1.404E-03	.0342	7.110E-04
T 1650 (131)	8.61	1.046E-03	.0267	1.335E-03	.0326	1.294E-03	.0317	6.571E-04
S 5251 (131)	8.61	1.046E-03	.0267	1.335E-03	.0326	1.294E-03	.0317	6.571E-04
M 7509 (131)	8.61	1.046E-03	.0267	1.335E-03	.0326	1.294E-03	.0317	6.571E-04
T 1651 (131)	9.67	1.025E-03	.0250	1.244E-03	.0304	1.215E-03	.0296	6.142E-04
S 5252 (131)	9.67	1.025E-03	.0250	1.244E-03	.0304	1.215E-03	.0296	6.142E-04
M 7510 (131)	9.67	1.025E-03	.0250	1.244E-03	.0304	1.215E-03	.0296	6.142E-04

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7/10/73

NASA-RI ORBITER PEATING AEDC(AMTAC-1) ARNOLD AFS, TENNESSEE  
VON KARMAN GAS DYNAMICS FACILITY  
50 INCH HYPERSONIC TUNNEL R

GROUP CONFID MODEL MACH NO DR(PISA) TU(DEC R) ALPHA-MODEL ALPHA-PREBEND ROLL-MODEL YAW  
124 2 ORBITER S 7.99 401.0 1321 30.03 -.03 -30.00 -180.00 -.00

T-1NF P-1NF Q-1NF V-1NF MU-1NF RU-1NF DE/FT MREF STREF  
(OFC B) (PISA) (PISA) (FT/SEC) (KUS/FT) (LB-SEC/FT) (E-1) (R-0175E1) (H-0175E1)  
94.0 .062 2.773 3035 5.427E-05 7.725E-04 2.194E 06 4.101E-02 2.479E-02

CAMERA WOLL MU PAINT TFP (OFC F) INITIAL TFP (OFC F) SQUARE ROOT (RMQACR) TRANITO BETA(TO)  
TOP(T) 7630 P0 0.0486 6.530E-02 6.1026E-02  
SI (IS) 7496  
BOTTOM(B) 7237

WIC NO	TIME RELTIME	WIC(T)	M(TO)/HREF	M(.910)	M(.910)/HREF	M(.91210)	M(.91210)/HREF	ST(TO)
T 1451(131)	9.49	1.024E-03	.0250	1.246E-03	.0204	1.213E-03	.0296	6.131E-04
T 1452(131)	10.71	9.643E-04	.0236	1.177E-03	.0287	1.145E-03	.0279	5.788E-04
M 7411(131)	10.71	9.643E-04	.0236	1.177E-03	.0287	1.145E-03	.0279	5.788E-04
S 2241(131)	10.74	9.643E-04	.0235	1.174E-03	.0286	1.143E-03	.0279	5.779E-04
T 1453(131)	11.79	1.024E-03	.0223	1.114E-03	.0272	1.085E-03	.0264	5.481E-04
S 2242(131)	11.79	1.024E-03	.0223	1.114E-03	.0272	1.085E-03	.0264	5.481E-04
M 7412(131)	11.79	1.024E-03	.0223	1.114E-03	.0272	1.085E-03	.0264	5.481E-04
T 1454(131)	12.84	1.024E-03	.0213	1.043E-03	.0259	1.034E-03	.0252	5.227E-04
S 2243(131)	12.84	1.024E-03	.0213	1.043E-03	.0259	1.034E-03	.0252	5.227E-04
M 7413(131)	12.84	1.024E-03	.0213	1.043E-03	.0259	1.034E-03	.0252	5.227E-04
T 1455(131)	13.89	1.024E-03	.0204	1.017E-03	.0248	9.844E-04	.0241	5.003E-04
S 2244(131)	13.89	1.024E-03	.0204	1.017E-03	.0248	9.844E-04	.0241	5.003E-04
M 7414(131)	13.89	1.024E-03	.0204	1.017E-03	.0248	9.844E-04	.0241	5.003E-04
T 1456(131)	14.97	1.024E-03	.0195	9.744E-04	.0234	9.511E-04	.0232	4.802E-04
S 2245(131)	14.97	1.024E-03	.0195	9.744E-04	.0234	9.511E-04	.0232	4.802E-04
M 7415(131)	14.97	1.024E-03	.0195	9.744E-04	.0234	9.511E-04	.0232	4.802E-04
T 1457(131)	16.02	1.024E-03	.0184	9.410E-04	.0224	9.154E-04	.0223	4.626E-04
S 2246(131)	16.02	1.024E-03	.0184	9.410E-04	.0224	9.154E-04	.0223	4.626E-04
M 7416(131)	16.02	1.024E-03	.0184	9.410E-04	.0224	9.154E-04	.0223	4.626E-04
T 1458(131)	17.07	1.024E-03	.0172	9.081E-04	.0222	8.844E-04	.0216	4.469E-04
S 2247(131)	17.07	1.024E-03	.0172	9.081E-04	.0222	8.844E-04	.0216	4.469E-04
M 7417(131)	17.07	1.024E-03	.0172	9.081E-04	.0222	8.844E-04	.0216	4.469E-04
T 1459(131)	18.12	1.024E-03	.0162	8.744E-04	.0215	8.565E-04	.0209	4.326E-04
S 2248(131)	18.12	1.024E-03	.0162	8.744E-04	.0215	8.565E-04	.0209	4.326E-04
M 7418(131)	18.12	1.024E-03	.0162	8.744E-04	.0215	8.565E-04	.0209	4.326E-04
T 1460(131)	19.15	1.024E-03	.0154	8.410E-04	.0214	8.254E-04	.0209	4.326E-04

477

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AFUGIADN, IAC.) AMNOLD AFS, TENNESSEE  
VON KARMAN GAS DYNAMICS FACILITY  
50 INCH HYPERSONIC TUNNEL A

5P2VA

[illegible]

PIC NO	TIME	DELTIME	M1(0)	M1(0)/MREF	M1(010)	M1(010)/MREF	M1(01010)	M1(01010)/MREF	S1(10)	
1	1500(1311)	19.20	7.009F-14	.0171	8.534E-04	.0202	8.304E-04	.0202	4.195E-04	
2	1501(1311)	17.00	7.009F-14	.0171	8.534E-04	.0202	8.304E-04	.0202	4.195E-04	
3	1502(1311)	19.20	7.009F-14	.0171	8.534E-04	.0202	8.304E-04	.0202	4.195E-04	
4	1503(1311)	19.20	7.009F-14	.0171	8.534E-04	.0202	8.304E-04	.0202	4.195E-04	
5	1504(1311)	20.05	6.812F-14	.0166	8.294E-04	.0197	8.070E-04	.0197	4.078E-04	
6	1505(1311)	20.05	6.812F-14	.0166	8.294E-04	.0197	8.070E-04	.0197	4.078E-04	
7	1506(1311)	20.05	6.812F-14	.0166	8.294E-04	.0197	8.070E-04	.0197	4.078E-04	
8	1507(1311)	20.05	6.812F-14	.0166	8.294E-04	.0197	8.070E-04	.0197	4.078E-04	
9	1508(1311)	21.20	6.653F-14	.0162	8.073E-04	.0197	7.851E-04	.0197	3.966E-04	
10	1509(1311)	21.20	6.653F-14	.0162	8.073E-04	.0197	7.851E-04	.0197	3.966E-04	
11	1510(1311)	21.22	6.653F-14	.0162	8.073E-04	.0197	7.851E-04	.0197	3.966E-04	
MODEL HAS LEFT CENTERLINE										
12	1520(1311)	22.15	6.653F-14	.0157	7.849E-04	.0192	7.657E-04	.0187	3.855E-04	
13	1521(1311)	22.15	6.653F-14	.0157	7.849E-04	.0192	7.657E-04	.0186	3.864E-04	
14	1522(1311)	22.15	6.653F-14	.0157	7.849E-04	.0192	7.657E-04	.0196	3.864E-04	

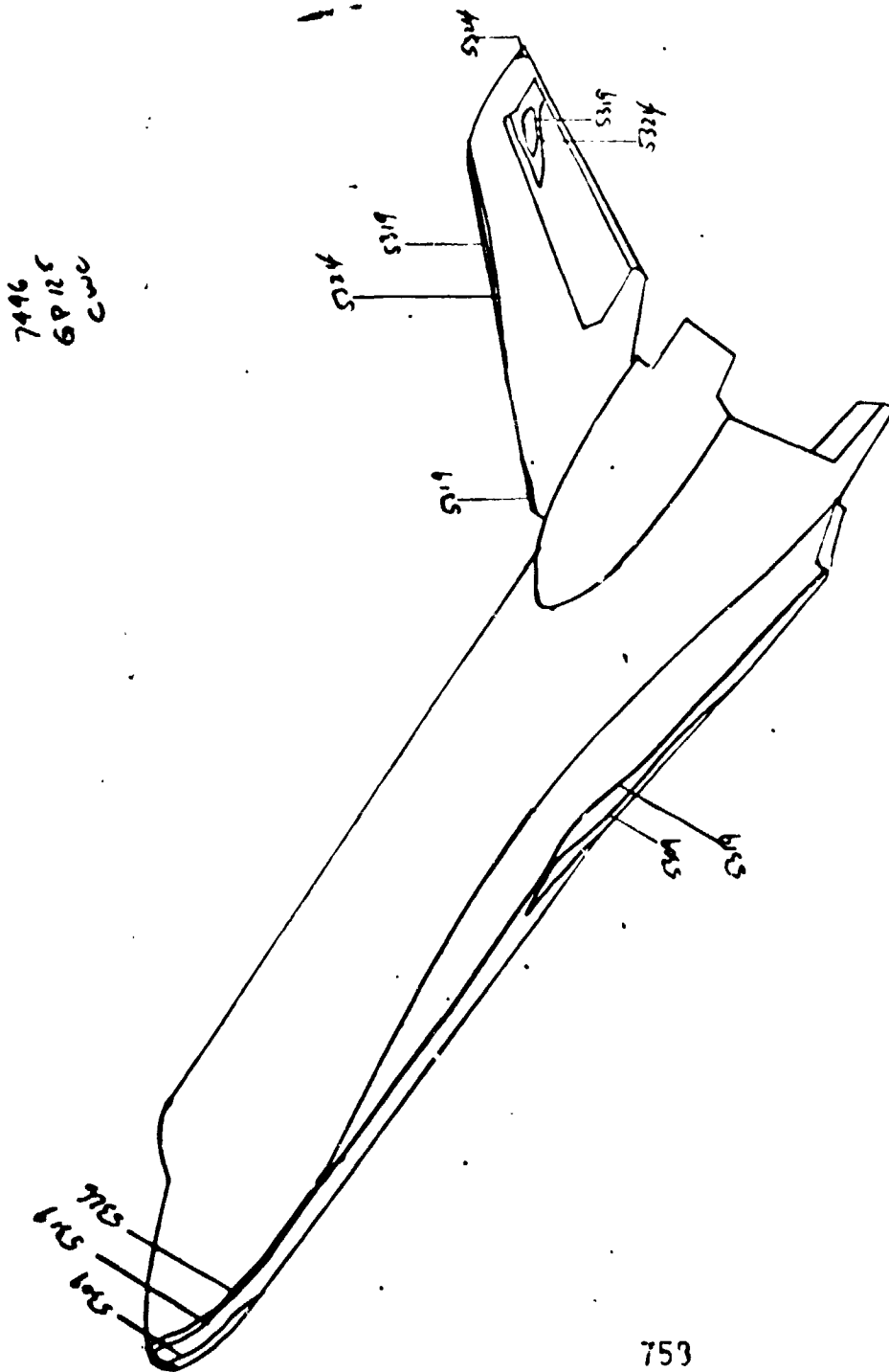
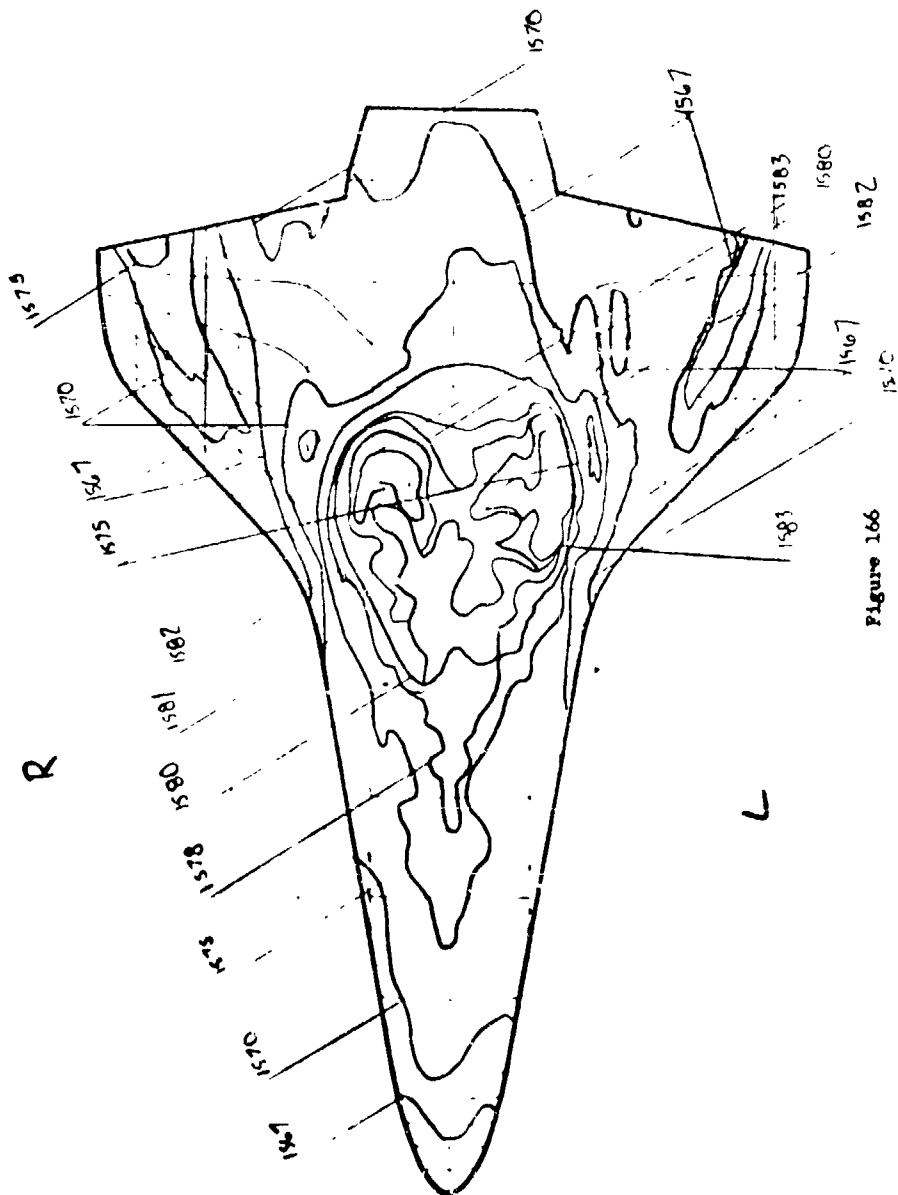


Figure 165

Group 125  
7830  
NW



8598  
 $\sigma = 35^\circ$   
 $\phi = 0^\circ$

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7/10/73

NASA-RI ORRITEM PEATING  
 VA289

GROUP CONFIG MODEL MACH NO POPSIAI TO( DEG R) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREBEND ROLL-MODEL YAW  
 125 2 ORRITEM S 7.09 402.5 1322 35.05 -5.05 -30.00 -180.00 --0.00

T-INF P-INF Q-INF V-INF RMQ-INF MU-INF RF/FT MREF STREF  
 (DEG R) (PSIA) (FT/SEC) (SLUGS/FT<sup>3</sup>) (LR-SEC/ET2) (EI-1) (R= .0175FT) (R= .0175FT)  
 96.0 .062 2.740 3834 5.436E-05 7.730E-08 2.498E 04 4.107E-02 2.477E-02

CAMFLA HOLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHOXCKA) TRAR(TO) BETA(TO)  
 TOP(T) 7430 80 .9535 0 0  
 SIRE(S) 7496  
 MOTIC(M) 7337

PIE NO TIME DELTIME H(TO) HREF H(TO)/HREF H( .923TO) HREF ST(TO)

T 1564(250) 1.18 MODEL HAS NOT REACHED CENTERLINE  
 S 5305(250) 1.18 MODEL HAS NOT REACHED CENTERLINE  
 M 7423(250) 1.18 MODEL HAS NOT REACHED CENTERLINE  
 T 1564(250) 2.23 MODEL HAS NOT REACHED CENTERLINE  
 S 5306(250) 2.25 MODEL HAS NOT REACHED CENTERLINE

INJECT TIME = 2.30

T 1564(250) 3.50 DATA NOT YET VALID  
 S 5307(250) 3.50 DATA NOT YET VALID

M 7525(250) 3.50 DATA NOT YET VALID  
 T 1567(250) 4.36 3.04 7.147E-03 .1740 9.400E-03 .2194 8.492E-03 .2068 4.245E-03  
 S 5308(250) 4.36 3.04 7.147E-03 .1740 9.400E-03 .2194 8.492E-03 .2068 4.245E-03  
 M 7526(250) 4.36 3.04 7.147E-03 .1740 9.400E-03 .2194 8.492E-03 .2068 4.245E-03  
 T 1568(250) 5.41 4.11 6.157E-03 .1501 7.773E-03 .1892 7.327E-03 .1784 3.660E-03  
 S 5309(250) 5.41 4.11 6.157E-03 .1501 7.773E-03 .1892 7.327E-03 .1784 3.660E-03  
 M 7527(250) 5.43 4.14 6.144E-03 .1447 7.749E-03 .1866 7.305E-03 .1778 3.649E-03  
 T 1569(250) 6.46 5.14 5.503E-03 .1339 6.937E-03 .1686 6.539E-03 .1592 3.266E-03  
 S 5310(250) 6.46 5.14 5.503E-03 .1339 6.937E-03 .1686 6.539E-03 .1592 3.266E-03  
 M 7528(250) 6.48 5.19 5.440E-03 .1336 6.920E-03 .1684 6.523E-03 .1588 3.258E-03  
 T 1570(250) 7.53 6.24 5.006E-03 .1219 6.510E-03 .1536 5.949E-03 .1448 2.971E-03  
 S 5311(250) 7.53 6.24 5.006E-03 .1219 6.510E-03 .1536 5.949E-03 .1448 2.971E-03  
 M 7529(250) 7.53 6.24 5.006E-03 .1219 6.510E-03 .1536 5.949E-03 .1448 2.971E-03  
 T 1571(250) 8.58 7.28 4.632E-03 .1127 5.838E-03 .1421 5.503E-03 .1340 2.749E-03  
 S 5312(250) 8.58 7.28 4.632E-03 .1127 5.838E-03 .1421 5.503E-03 .1340 2.749E-03  
 M 7530(250) 8.58 7.28 4.632E-03 .1127 5.838E-03 .1421 5.503E-03 .1340 2.749E-03  
 T 1572(250) 9.64 8.34 4.624E-03 .1126 5.829E-03 .1418 5.494E-03 .1337 2.744E-03  
 S 5313(250) 9.64 8.34 4.624E-03 .1126 5.829E-03 .1418 5.494E-03 .1337 2.744E-03  
 M 7531(250) 9.64 8.34 4.624E-03 .1126 5.829E-03 .1418 5.494E-03 .1337 2.744E-03

479

789

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REPRODUCIBILITY OF THE ORIGINAL PAGE IS POOR.

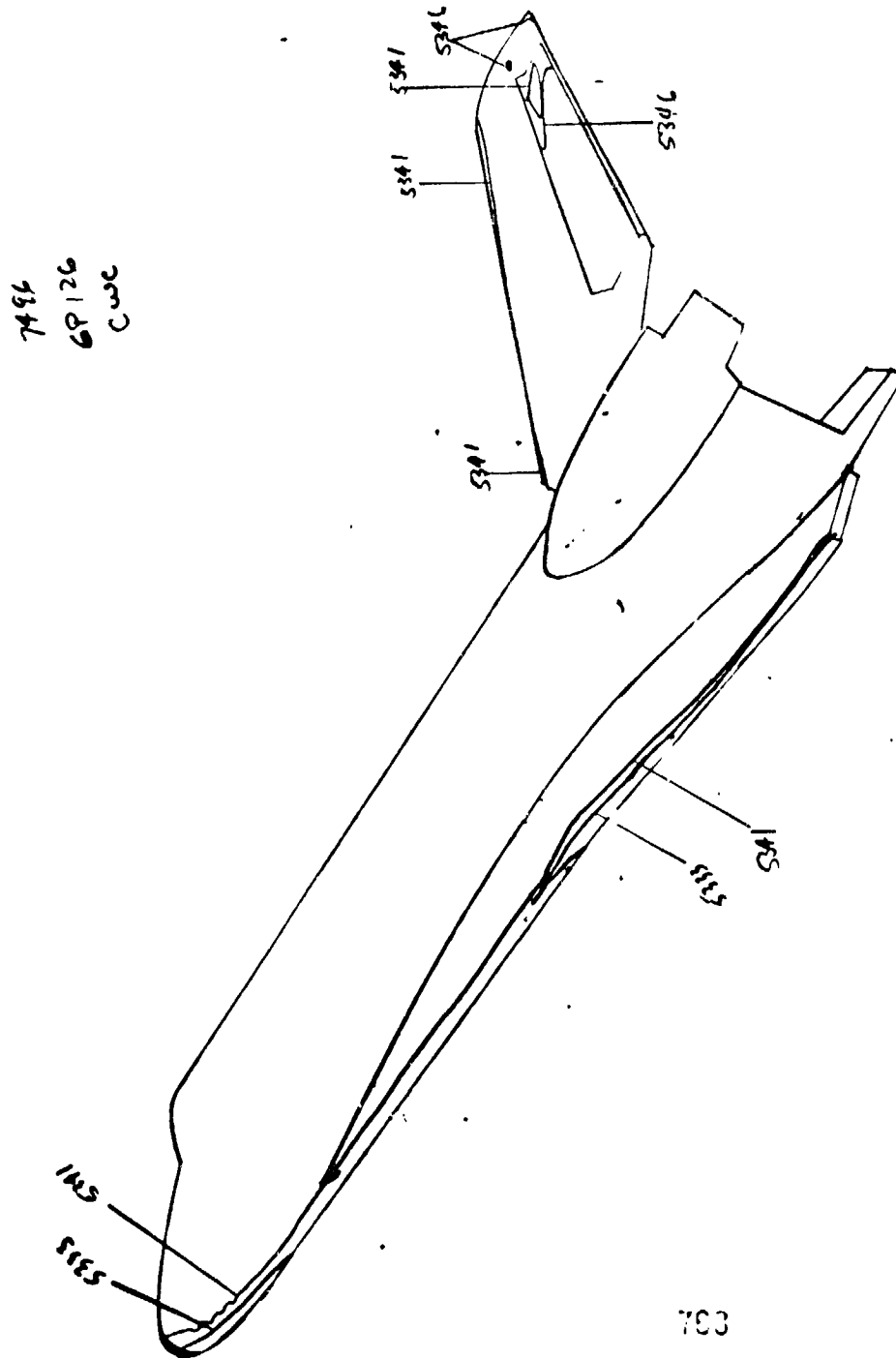
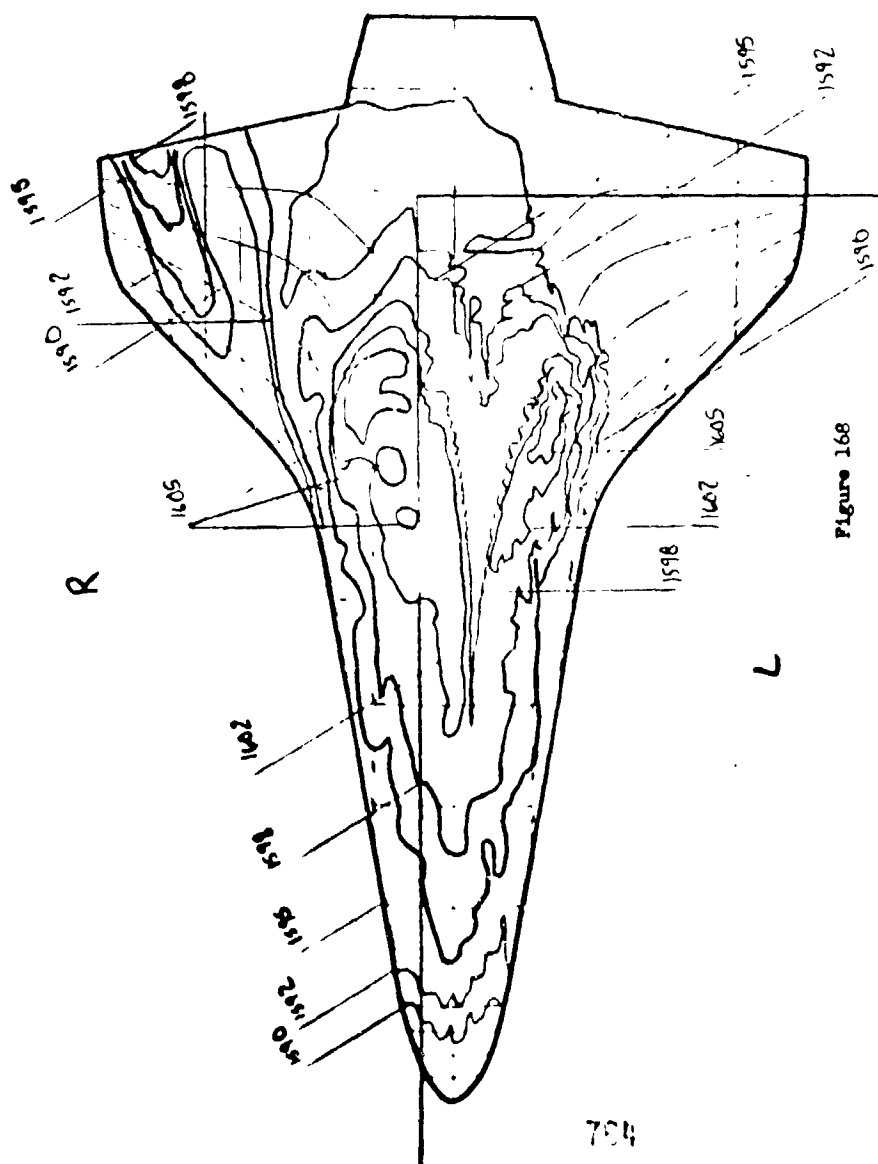


Figure 167

REPRODUCIBILITY OF THE ORIGINAL PAGE IS POOR.

Group 126  
7830  
105

8598  
 $\alpha = 35^\circ$   
 $\phi = 0^\circ$



784



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7/10/73

MASA-WI ORBITER HEATING  
AEDC(HQ, INC.) ARNOLD AFS, TENNESSEE  
VON KARMAN GAS DYNAMICS FACILITY  
50 INCH HYPERSONIC TUNNEL R

VA249

GROUP COMPETE MODEL MACH NO PO(PSTIA) TO(DEC R) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREBEND ROLL-MODEL YAW  
124 5 CREITER R2 7.99 601.5 1320 35.05 -5.05 -30.00 -180.00 -0.00

T-TAF P-INF Q-INF V-INF RMO-INF MU-INF RE/FT MRFF STREF  
(DEG R) (PSIA) (PSIA) (FT/SEC) (SLUGS/ I3) (LB-SEC/FT2) (FT-I) (R= .0175FI) (R= .0175FI)  
95.9 .002 2.776 1834 5.433F-05 7.721E-08 2.698E 06 4.103E-02 2.477E-02

CAMERA HULL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (HMOXCAK) YBAR(10) BETA(10)  
TOP(1) 7830  
SIDE(5) 7406 250  
BOTTOM(18) 7337 .0535 2.174E-01 2.3423E-01

PTC NO	TIME	DELTIME	H(10)	H(TO)/HREF	M(10)	M(10)/HREF	M(10)/HREF	M(10)/HREF	ST(10)
M 7555(250)	10.69	9.30	4.048E-03	.0997	5.154E-03	.1257	4.859E-03	.1184	2.432E-03
T 1596(250)	10.71	9.42	4.043E-03	.0995	5.147E-03	.1255	4.852E-03	.1183	2.429E-03
S 5737(250)	10.71	9.42	4.043E-03	.0995	5.147E-03	.1255	4.852E-03	.1183	2.429E-03
T 1597(250)	11.76	10.47	3.873E-03	.0944	4.892E-03	.1190	4.602E-03	.1122	2.303E-03
S 5738(250)	11.76	10.47	3.873E-03	.0944	4.892E-03	.1190	4.602E-03	.1122	2.303E-03
M 7556(250)	11.76	10.47	3.873E-03	.0944	4.892E-03	.1190	4.602E-03	.1122	2.303E-03
T 1598(250)	12.81	11.52	3.642E-03	.0900	4.654E-03	.1135	4.387E-03	.1070	2.196E-03
S 5739(250)	12.81	11.52	3.642E-03	.0900	4.654E-03	.1135	4.387E-03	.1070	2.196E-03
M 7557(250)	12.81	11.52	3.642E-03	.0900	4.654E-03	.1135	4.387E-03	.1070	2.196E-03
T 1599(250)	13.87	12.57	3.534E-03	.0861	4.456E-03	.1086	4.200E-03	.1023	2.101E-03
S 5740(250)	13.87	12.57	3.534E-03	.0861	4.456E-03	.1086	4.200E-03	.1023	2.101E-03
M 7558(250)	13.87	12.57	3.534E-03	.0861	4.456E-03	.1086	4.200E-03	.1023	2.101E-03
T 1600(250)	14.92	13.62	3.345E-03	.0827	4.246E-03	.1043	4.034E-03	.0983	2.018E-03
S 5741(250)	14.92	13.62	3.345E-03	.0827	4.246E-03	.1042	4.031E-03	.0982	2.016E-03
M 7559(250)	14.92	13.62	3.345E-03	.0827	4.246E-03	.1042	4.031E-03	.0982	2.016E-03
T 1601(250)	15.99	14.70	3.244E-03	.0797	4.120E-03	.1004	3.884E-03	.0947	1.943E-03
S 5742(250)	15.99	14.70	3.244E-03	.0797	4.120E-03	.1004	3.884E-03	.0947	1.943E-03
M 7560(250)	15.99	14.70	3.244E-03	.0797	4.120E-03	.1004	3.884E-03	.0947	1.943E-03
T 1602(250)	17.04	15.75	3.137E-03	.0769	3.990E-03	.0970	3.752E-03	.0914	1.877E-03
S 5743(250)	17.04	15.75	3.137E-03	.0769	3.990E-03	.0970	3.752E-03	.0914	1.877E-03
M 7561(250)	17.04	15.75	3.137E-03	.0769	3.990E-03	.0970	3.752E-03	.0914	1.877E-03
T 1603(250)	18.10	16.86	3.037E-03	.0745	3.854E-03	.0939	3.633E-03	.0885	1.816E-03
S 5744(250)	18.10	16.86	3.037E-03	.0745	3.854E-03	.0939	3.633E-03	.0885	1.816E-03
M 7562(250)	18.10	16.86	3.037E-03	.0745	3.854E-03	.0939	3.633E-03	.0885	1.816E-03
T 1604(250)	19.17	17.88	2.944E-03	.0722	3.734E-03	.0910	3.522E-03	.0858	1.761E-03
S 5745(250)	19.17	17.88	2.944E-03	.0722	3.734E-03	.0910	3.522E-03	.0858	1.761E-03
M 7563(250)	19.17	17.88	2.944E-03	.0722	3.734E-03	.0910	3.522E-03	.0858	1.761E-03

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7/10/73

AEDC(ARO-INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL R

NASA-R1 ORBITER HEATING  
 VA2R9

GROUP CONFIG MODEL MACH NO PR(PISA) T(DEG R) ALPHA-MODEL ALPHA-SECTCH ALPHA-PREBEND ROLL-MODEL YAW  
 126 2 CRITERM R2 7.99 601.9 1320 35.05 -5.05 -30.00 -180.00 -0.00

T-INF 0-INF 0-INF V-INF RHO-INF MU-INF DE/FT HREF STREF  
 (DEG R) (PISA) (PISA) (FT/SEC) (SLUGS/FT<sup>3</sup>) (LB-SEC/FT<sup>2</sup>) (BT-1) (R= .0175E1) (R= .0175E1)  
 95.6 .062 2.777 3634 5.438E-05 7.720E-08 2.700E 06 4.104E-02 2.474E-02

CARFCA HOLL NO PAINT IFUP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHOCCK) TRAR(TO) BETA(TO)  
 T(FT) 7830  
 S(FT) 7494  
 MOT(MIN) 7237

PIC N)	TIME	MELTIME	M(TO)	M(TO)/HREF	M(0T0)	M(0T0)/HREF	M(023TO)	M(023TO)/HREF	ST(TO)
T 1405(250)	20.22	19.03	2.803E-03	.0702	3.631E-03	.0885	3.423E-03	.0834	1.712E-03
N 5746(250)	20.22	19.03	2.803E-03	.0702	3.631E-03	.0885	3.423E-03	.0834	1.712E-03
M 7644(250)	20.22	19.03	2.803E-03	.0702	3.631E-03	.0885	3.423E-03	.0834	1.712E-03
T 1405(250)	21.27	19.08	2.803E-03	.0683	3.631E-03	.0861	3.331E-03	.0812	1.665E-03
N 5746(250)	21.27	19.08	2.803E-03	.0683	3.631E-03	.0861	3.331E-03	.0812	1.665E-03
M 7644(250)	21.27	19.08	2.803E-03	.0683	3.631E-03	.0861	3.331E-03	.0812	1.665E-03
T 1405(250)	22.25	21.04	2.731E-03	.0665	3.443E-03	.0839	3.245E-03	.0791	1.622E-03
N 5746(250)	22.25	21.04	2.731E-03	.0665	3.443E-03	.0839	3.245E-03	.0791	1.622E-03
M 7644(250)	22.25	21.04	2.731E-03	.0665	3.443E-03	.0839	3.245E-03	.0791	1.622E-03
MODEL WAS LEFT CENTERLINE									
T 1405(250)	23.25	22.11	2.665E-03	.0649	3.360E-03	.0819	3.167E-03	.0772	1.583E-03
N 5746(250)	23.25	22.11	2.665E-03	.0649	3.360E-03	.0819	3.167E-03	.0772	1.583E-03
M 7644(250)	23.25	22.11	2.665E-03	.0649	3.360E-03	.0819	3.167E-03	.0772	1.583E-03

REPRODUCIBILITY OF THE ORIGINAL PAGE IS POOR.

Group 127  
7830  
E model

8595  
 $\alpha = 30^\circ$   
 $\phi = 0^\circ$

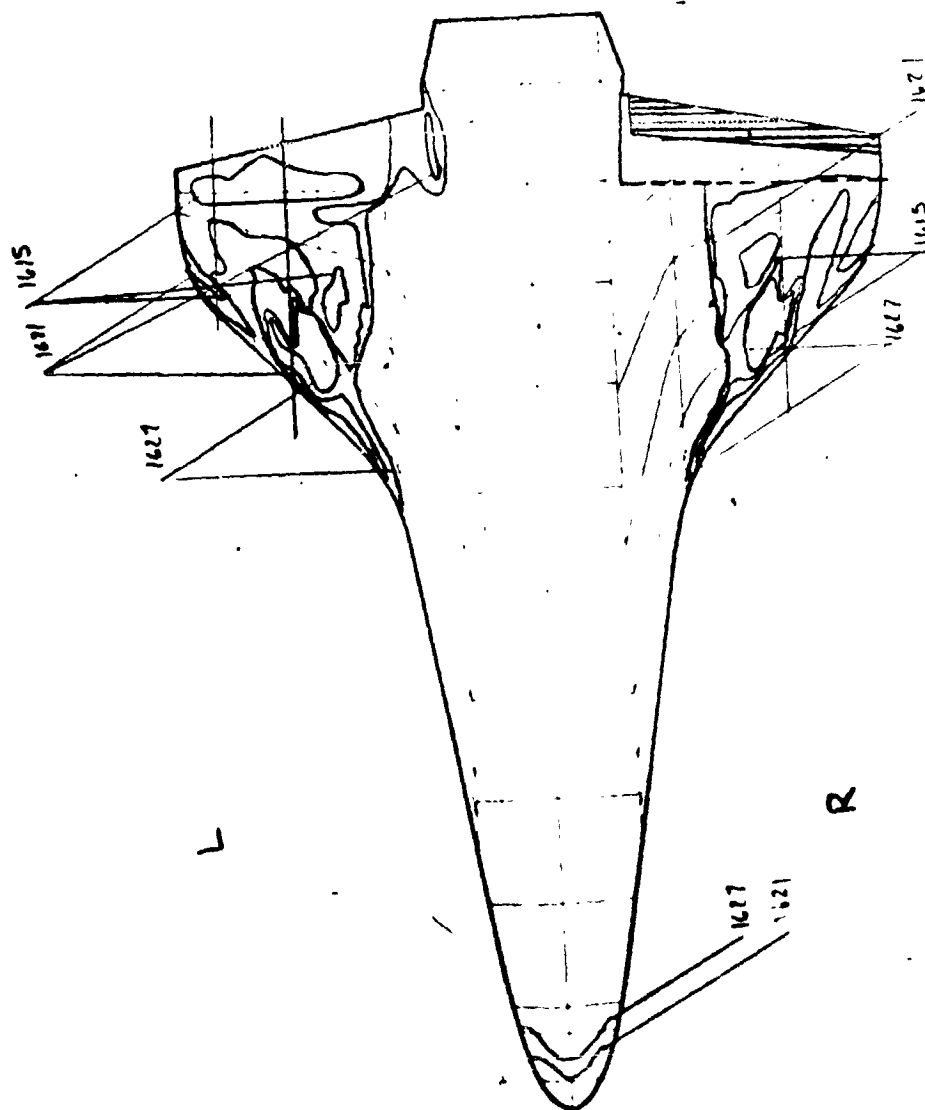


Figure 169

783

REPRODUCIBILITY OF THE ORIGINAL, PAGE IS POOR.

Group 127  
7357  
N3  
[ 11006L

4528  
 $\alpha = 30^\circ$   
 $\phi = 0^\circ$

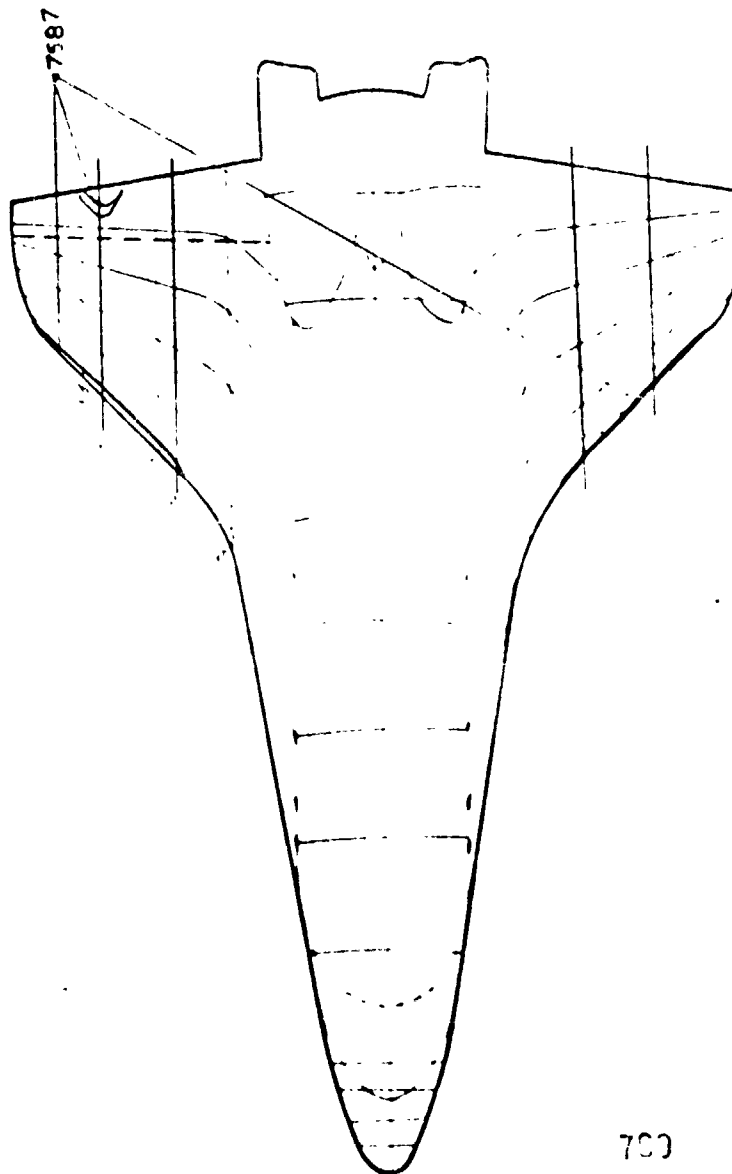


Figure 170

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7/10/73

AECIARO, INC.) ARNOLD AFS, TENNESSEE  
 VON KAMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL 9

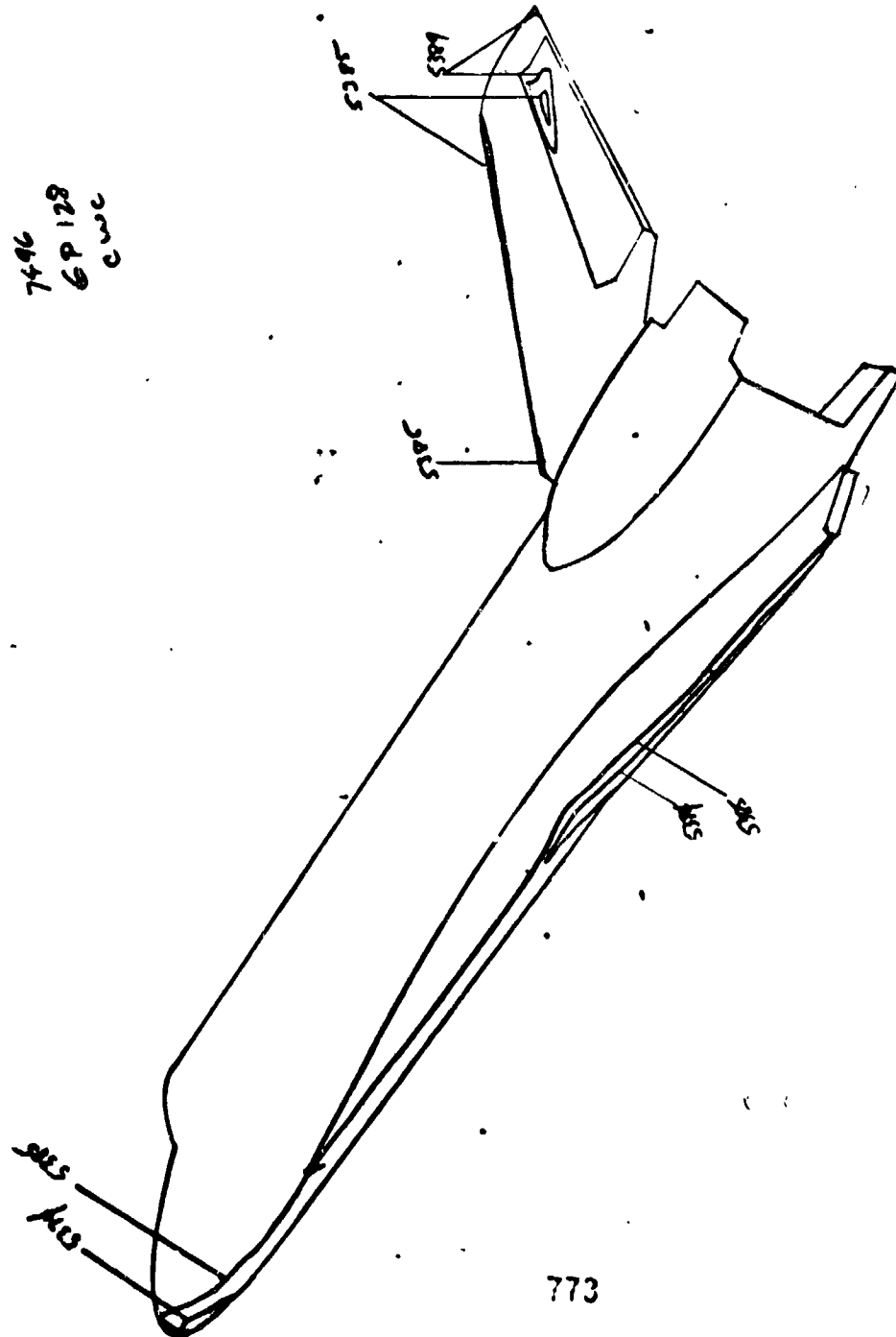
MASA-RI ORBITER HEATING

V4299

LAQUE	COMPIC	MODEL	MACH NO	PROPSIA	TO (DEG H)	ALPHA-MODEL	ALPHA-SECTOR	ALPHA-PREBEND	ROLL-MODEL	YAW
127	1	ORBITER E	7.99	59A.9	1317	30.01	-0.01	-30.00	-100.00	-0.00
T-1AF	0-1AF	0-1AF	0-1AF	0-1AF	0-1AF	0-1AF	0-1AF	0-1AF	0-1AF	0-1AF
(DEG H)	(DEG H)	(DEG H)	(DEG H)	(DEG H)	(DEG H)	(DEG H)	(DEG H)	(DEG H)	(DEG H)	(DEG H)
90.7	90.2	7.744	3820	5.424E-05	7.702E-08	2.497E-06	4.092E-02	2.474E-02		
CARPER	ROLL NO	PAINT IFMP	(OFU F)	INITIAL TEMP	(DEG F)	SQUARE ROOT	(RHOACR)	TRAN (TO)	RETA (TO)	
7030										
SIGFIS	7096	400				.9555		4.116E-01	5.5530E-01	
MOTICMIS	7227									

PIC NO	TIME	DELTIME	M(TO)	M(TO)/MREF	M(.910)	M(.910)/MREF	M(.912TU)	M(.912TU)/MREF	ST(TO)
1	1424(400)	19.20	17.90	7.243E-03	1.740	9.927E-03	2.425	9.495E-03	4.309E-03
M	1424(400)	19.20	17.90	7.243E-03	1.740	9.927E-03	2.425	9.495E-03	4.309E-03
S	1424(400)	19.22	17.90	7.274E-03	1.774	9.920E-03	2.424	9.489E-03	4.305E-03
1	1427(400)	20.27	18.98	7.074E-03	1.724	9.641E-03	2.355	9.222E-03	4.184E-03
S	1427(400)	20.27	18.98	7.074E-03	1.724	9.641E-03	2.355	9.222E-03	4.184E-03
M	1428(400)	20.27	18.98	7.074E-03	1.724	9.641E-03	2.355	9.222E-03	4.184E-03
1	1428(400)	21.32	20.03	6.846E-03	1.682	9.345E-03	2.293	8.977E-03	4.073E-03
S	1428(400)	21.32	20.03	6.846E-03	1.682	9.345E-03	2.293	8.977E-03	4.073E-03
M	1429(400)	21.32	20.03	6.846E-03	1.682	9.345E-03	2.293	8.977E-03	4.073E-03
1	1429(400)	22.33	21.08	6.712E-03	1.648	9.148E-03	2.216	8.750E-03	3.973E-03
S	1429(400)	22.40	21.11	6.712E-03	1.639	9.143E-03	2.214	8.745E-03	3.970E-03
M	1430(400)	22.40	21.11	6.704E-03	1.639	9.143E-03	2.214	8.745E-03	3.970E-03

REPRODUCIBILITY OF THE ORIGINAL PAGE IS POOR.



REPRODUCIBILITY OF THE ORIGINAL PAGE IS POOR.

Group 128  
7830  
MD

8598  
 $\alpha = 35^\circ$   
 $\phi = 0^\circ$

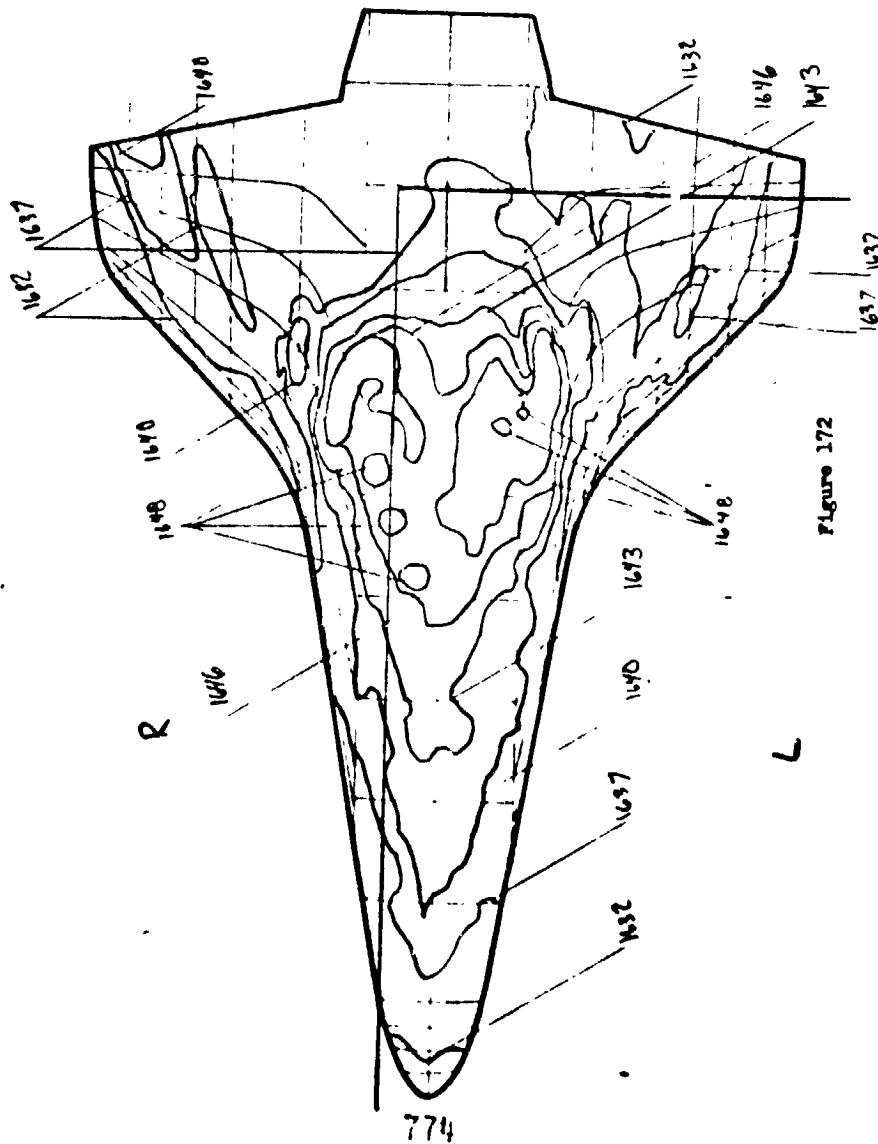


Figure 172

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7/10/73

NASA-R1 ORBITER HEATING  
 VA209  
 AEDC(ARND-INC.) ARNDLU AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL R

GROUP CONFIG MODEL MACH NO PO(PSIA) TO(DEG R) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREBEND ROLL-MODEL YAW  
 12A 4 ORBITER R1 7.99 401.5 1317 35.02 -5.02 -30.00 -180.00 -0.00

T-INF P-INF O-INF V-INF MU-INF RMO-INF RE/FT HREF STRCF  
 (DEG R) (PSIA) (PSIA) (FT/SEC) (SLUGS/FT3) (LR-SEC/FT2) (FT-1) (R= .0175EI) (R= .0175EI)  
 95.4 .062 2.776 3829 5.448E-05 7.701E-09 2.709E 06 4.101E-02 2.473E-02

CAMERA ROLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHO/CAK) TRAR(TO) BETA(TO)

TOP(TI) 7630  
 SIDF(S) 7496  
 MOTICM(R) 7337  
 R0 .0535 0 0

PIC NO TIME RELTIME HITO HITO/HREF HI(QTO) HI(QTO)/HREF HI(QTO)/HREF ST(TO)

M 7594(250) 1.15 MODEL HAS NOT REACHED CENTERLINE  
 T 1430(250) 1.18 MODEL HAS NOT REACHED CENTERLINE  
 S 5371(250) 2.23 MODEL HAS NOT REACHED CENTERLINE  
 T 1431(250) 2.23 MODEL HAS NOT REACHED CENTERLINE  
 M 7590(250) 2.23 MODEL HAS NOT REACHED CENTERLINE

INJECT TIME = 2.39  
 T 1432(250) 3.28 DATA NOT YET VALID  
 M 7591(250) 3.28 DATA NOT YET VALID

S 5373(250) 3.30 DATA NOT YET VALID  
 M 7592(250) 3.30 3.04 7.231E-03 .1703 9.123E-03 .2224 8.599E-03 .2096 4.291E-03 483  
 T 1433(250) 4.26 3.04 7.201E-03 .1754 9.085E-03 .2215 8.564E-03 .2088 4.275E-03  
 S 5374(250) 4.36 3.04 7.201E-03 .1754 9.085E-03 .2215 8.564E-03 .2088 4.275E-03  
 T 1434(250) 5.41 4.11 6.213E-03 .1514 7.839E-03 .1911 7.389E-03 .1801 3.686E-03  
 S 5375(250) 5.41 4.11 6.213E-03 .1514 7.839E-03 .1911 7.389E-03 .1801 3.686E-03  
 M 7593(250) 5.41 4.11 6.213E-03 .1514 7.839E-03 .1911 7.389E-03 .1801 3.686E-03  
 T 1435(250) 6.46 5.14 5.545E-03 .1352 6.996E-03 .1705 6.594E-03 .1607 3.290E-03  
 S 5376(250) 6.46 5.14 5.545E-03 .1352 6.996E-03 .1705 6.594E-03 .1607 3.290E-03  
 M 7594(250) 6.46 5.14 5.545E-03 .1352 6.996E-03 .1705 6.594E-03 .1607 3.290E-03  
 T 1436(250) 7.51 6.22 5.035E-03 .1232 6.377E-03 .1552 6.011E-03 .1465 2.997E-03  
 S 5377(250) 7.51 6.22 5.035E-03 .1232 6.377E-03 .1552 6.011E-03 .1465 2.997E-03  
 M 7595(250) 7.51 6.22 5.035E-03 .1232 6.377E-03 .1552 6.011E-03 .1465 2.997E-03  
 T 1437(250) 7.53 6.24 5.044E-03 .1230 6.364E-03 .1552 5.999E-03 .1463 2.991E-03  
 S 5378(250) 8.58 7.29 4.607E-03 .1137 5.898E-03 .1435 5.550E-03 .1352 2.768E-03  
 M 7596(250) 8.58 7.29 4.607E-03 .1137 5.898E-03 .1435 5.550E-03 .1352 2.768E-03  
 T 1438(250) 8.58 7.29 4.607E-03 .1137 5.898E-03 .1435 5.550E-03 .1352 2.768E-03  
 S 5379(250) 9.64 8.34 4.363E-03 .1063 5.504E-03 .1341 5.188E-03 .1264 2.588E-03  
 M 7597(250) 9.64 8.34 4.363E-03 .1063 5.504E-03 .1341 5.188E-03 .1264 2.588E-03

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AEDC(ARO,INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL R

NASA-HI ORBITER HEATING

VA289

HRG:R CONFIG MODEL MACH NO PO(P(SIA) T(IDEG R) ALPHA-MODEL ALPHA-SECTION ALPHA-PREBEND ROLL-MODEL YAW  
 129 A CREITER R1 7.99 602.3 1317 3.02 -5.02 -30.00 -180.00 -0.00

T-INF P-INF Q-INF V-INF MU-INF RHO-INF RE/FT MREF STREF  
 (DEG F) (PSIA) (PSIA) (PSIA) (FT/SEC) (SLUGS/FT3) (LH-SEC/FT2) (EI-1) (RZ-.0175EI) (RZ-.0175FI)  
 9.64 .052 2.779 3029 5.456E-05 7.700F-08 2.713E 06 4.103E-02 2.471E-02

CAMERA ROLL NO PAINT IFMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHOXCAK) TRAR(TO) RETAITO)  
 TOP(T) 7830  
 SIDE(S) 7406  
 BOTTOM(B) 7237

HIC NO	TIME	DELTIME	H(10)	H(TO)/HREF	H(.9TO)	HREF	H(.923TO)	HREF	ST(10)
T 1439(250)	10.69	9.30	4.111E-03	.1002	5.187E-03	.1264	4.889E-03	.1192	2.439E-03
M 7594(250)	10.69	9.30	4.111E-03	.1002	5.187E-03	.1264	4.889E-03	.1192	2.439E-03
S 5793(250)	10.71	9.42	4.104E-03	.1001	5.180E-03	.1253	4.883E-03	.1190	2.436E-03
M 7594(250)	11.74	10.45	3.899E-03	.0950	4.919E-03	.1199	4.637E-03	.1130	2.312E-03
T 1441(250)	11.76	10.47	3.894E-03	.0949	4.913E-03	.1197	4.631E-03	.1129	2.310E-03
M 7594(250)	11.76	10.47	3.894E-03	.0949	4.913E-03	.1197	4.631E-03	.1129	2.310E-03
T 1441(250)	12.61	11.52	3.713E-03	.0905	4.694E-03	.1141	4.415E-03	.1076	2.202E-03
M 7594(250)	12.61	11.52	3.713E-03	.0905	4.694E-03	.1141	4.415E-03	.1076	2.202E-03
T 1441(250)	12.61	11.52	3.713E-03	.0905	4.694E-03	.1141	4.415E-03	.1076	2.202E-03
M 7594(250)	13.67	12.57	3.554E-03	.0866	4.494E-03	.1093	4.224E-03	.1030	2.108E-03
T 1441(250)	13.67	12.57	3.554E-03	.0866	4.494E-03	.1093	4.224E-03	.1030	2.108E-03
M 7594(250)	13.67	12.57	3.554E-03	.0866	4.494E-03	.1093	4.224E-03	.1030	2.108E-03
T 1441(250)	14.52	13.62	3.411E-03	.0831	4.307E-03	.1050	4.060E-03	.0989	2.024E-03
M 7594(250)	14.54	13.65	3.411E-03	.0831	4.307E-03	.1050	4.060E-03	.0989	2.024E-03
T 1441(250)	15.57	14.68	3.240E-03	.0801	4.150E-03	.1011	3.912E-03	.0953	1.950E-03
M 7594(250)	15.59	14.70	3.240E-03	.0801	4.150E-03	.1011	3.912E-03	.0953	1.950E-03
T 1441(250)	15.59	14.70	3.240E-03	.0801	4.150E-03	.1011	3.912E-03	.0953	1.950E-03
M 7594(250)	17.04	15.75	3.175E-03	.0774	4.006E-03	.0976	3.776E-03	.0920	1.882E-03
T 1441(250)	17.04	15.75	3.175E-03	.0774	4.006E-03	.0976	3.776E-03	.0920	1.882E-03
M 7594(250)	17.04	15.75	3.175E-03	.0774	4.006E-03	.0976	3.776E-03	.0920	1.882E-03
T 1441(250)	18.10	16.80	3.074E-03	.0749	3.876E-03	.0945	3.656E-03	.0891	1.821E-03
M 7594(250)	18.12	16.83	3.074E-03	.0749	3.876E-03	.0945	3.656E-03	.0891	1.821E-03
T 1441(250)	18.12	16.83	3.074E-03	.0749	3.876E-03	.0945	3.656E-03	.0891	1.821E-03
M 7594(250)	19.17	17.88	2.940E-03	.0726	3.760E-03	.0916	3.544E-03	.0863	1.766E-03
T 1441(250)	19.17	17.88	2.940E-03	.0726	3.760E-03	.0916	3.544E-03	.0863	1.766E-03
M 7594(250)	19.17	17.88	2.940E-03	.0726	3.760E-03	.0916	3.544E-03	.0863	1.766E-03

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NASA-KI ORBITER HEATING

AEDC(ARO, INC.) ARNOLD AFB, TENNESSEE  
VON KARMAN GAS DYNAMICS FACILITY  
50 INCH HYPERSONIC TUNNEL 9

VA209

GROUP	CONFIG	MODEL	MACH NO	PO(PSIA)	TO(CEG R)	ALPHA-MODEL	ALPHA-SECTOR	ALPHA-PREBEND	ROLL-MODEL	YAW
124	4	ORBITER R1	7.99	602.8	1317	35.02	-5.02	-30.00	-180.00	-0.00
T-INF	P-INF	Q-INF	V-INF	RHO-INF	MU-INF	RF/FT	HREF	STREF		
(DEG R)	(PSIA)	(PSIA)	(FT/SEC)	(SLUGS/FT3)	(LB-SEC/FT2)	(FI-1)	(R= .0175EI)	(H= .0175EI)		
45.4	.062	2.722	3824	5.460E-05	7.700F-08	2.715E 04	4.105E-02	2.470E-02		

CAMERA	HOLL NO	PAINT TEMP (DFG F)	INITIAL TEMP (DEG F)	SQUARE ROOT (RHOXCK)	TRAR(10)	BETA(10)
TOP(1)	7830					
SIDE(S)	7496	250		.0535	2.188E-01	2.3555E-01
MOT(M(R)	7337		80			

PIC NO	TIME DELTIME	H(10)	H(T0)/HREF	M(-9T0)	M(-9T0)/HREF	M(-923T0)	M(-923T0)/HREF	ST(10)
M 7407(250)	20.22	18.93	2.896E-03	.0705	3.654E-03	.0890	3.444E-03	.0839
T 1448(250)	20.25	18.96	2.894E-03	.0705	3.652E-03	.0890	3.442E-03	.0839
S 5349(250)	20.25	14.94	2.894E-03	.0705	3.652E-03	.0890	3.442E-03	.0839
F 1449(250)	21.30	20.01	2.817E-03	.0686	3.554E-03	.0866	3.351E-03	.0816
S 5390(250)	21.30	20.01	2.817E-03	.0686	3.554E-03	.0866	3.351E-03	.0816
M 7408(250)	21.30	20.01	2.817E-03	.0686	3.554E-03	.0866	3.351E-03	.0816
	21.32							

MODEL HAS LEFT CENTERLINE

7496  
6P 129  
CWC

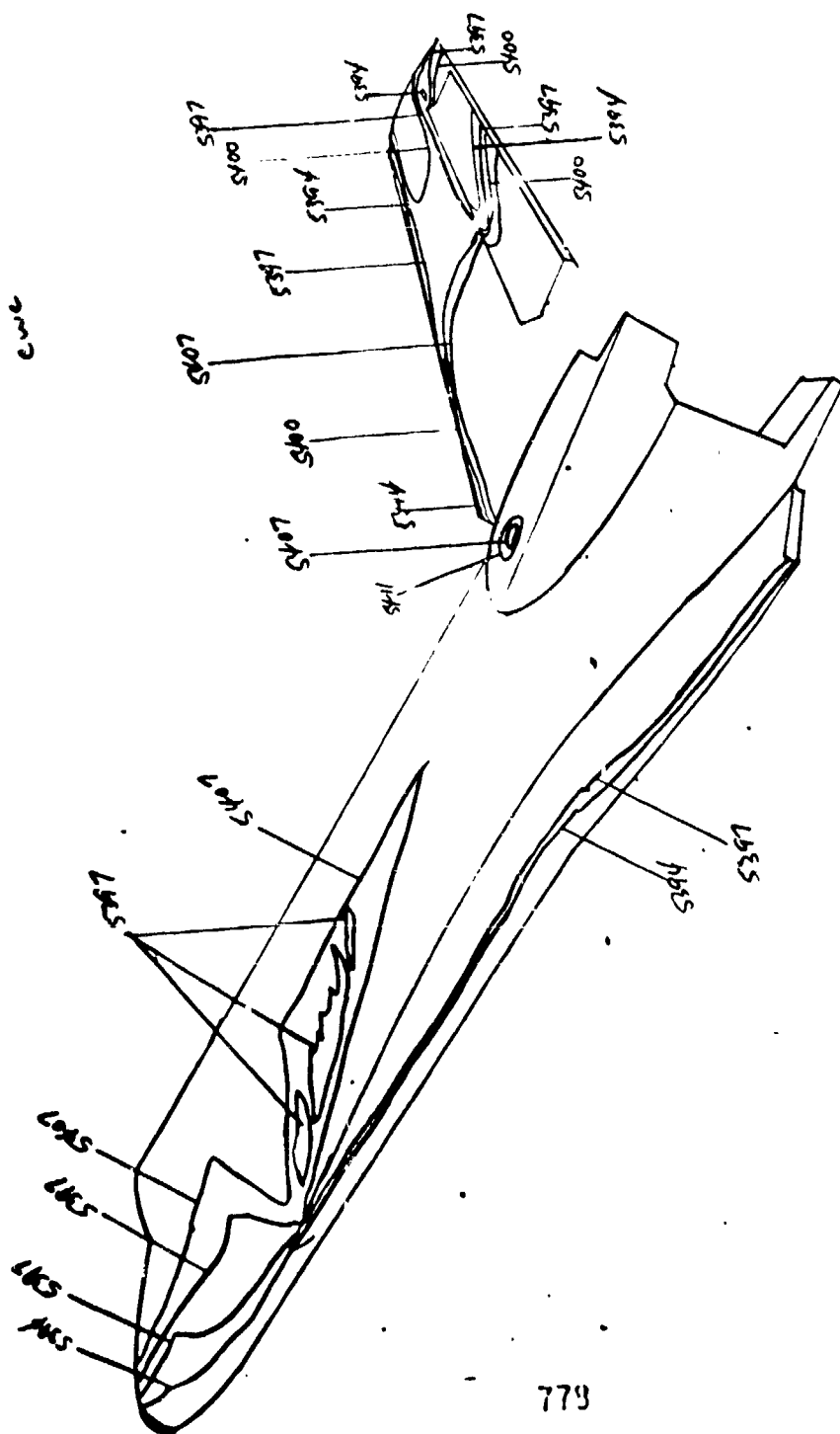


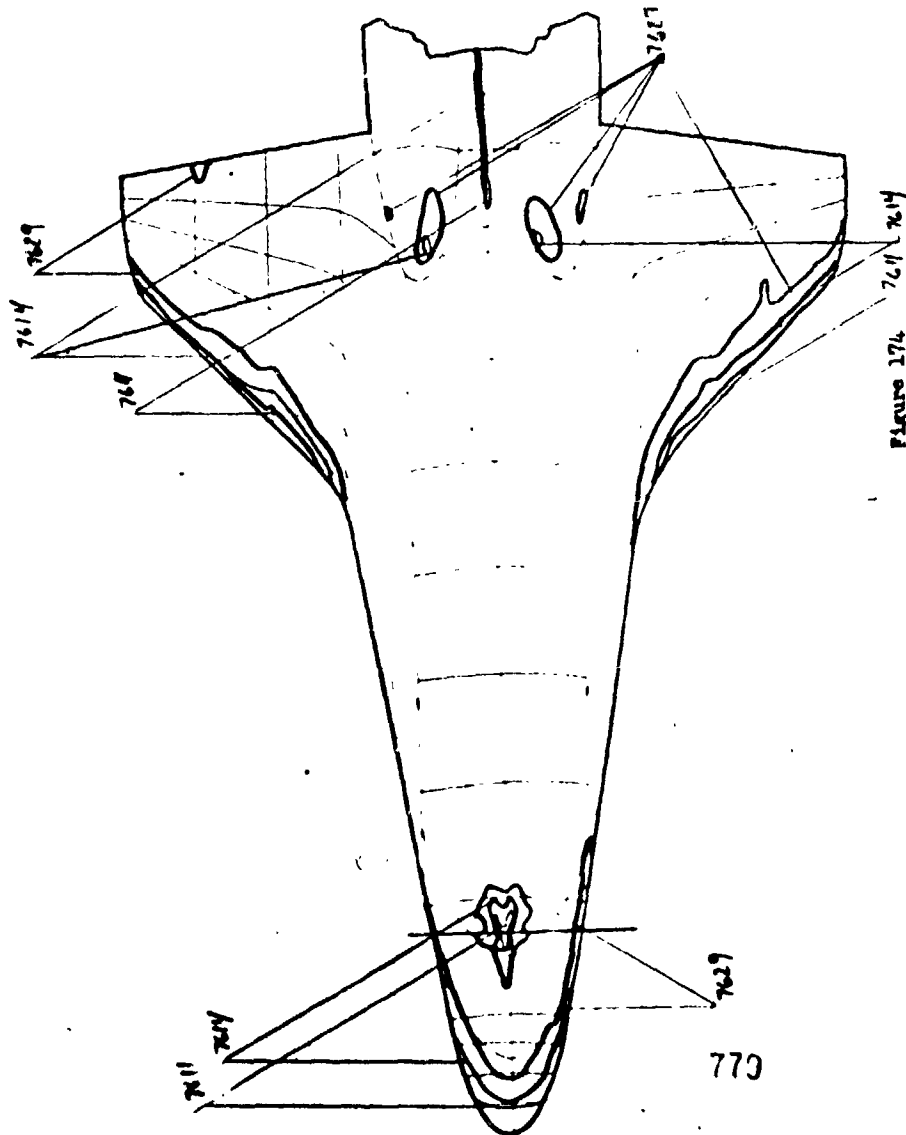
Figure 173



REPRODUCIBILITY OF THE ORIGINAL PAGE IS POOR.

Group 129  
7337  
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4531  
 $\sigma = 35^\circ$   
 $\phi = 0^\circ$



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7/10/73

NASA-R1 ORBITER PEATING

VA249

AEDCIAR01(100) ARNOLD AFS, TENNESSEE  
VON KARMAN GAS DYNAMICS FACILITY  
50 INCH HYPERSONIC TUNNEL A

GROUP CONFIG MODEL MACH NO PR(PISA) T(IDEGR) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREBEND ROLL-MODEL YAW  
129 2 ORBITER S 7.99 599.4 1317 35.03 -5.03 -30.00 -180.00 --0.00  
T-INF P-INF O-INF V-INF RHO-INF MU-INF DE/FT MREF SREF  
(DEGR) (PSIA) (PSIA) (FT/SEC) (SLUGS/FT3) (LH-SEC/FT2) (FT-1) (R= .0175FI) (R= .0175FI)  
95.6 .062 2.766 3820 5.430E-05 7.699E-08 2.700E 04 4.003E-02 2.477E-02  
CAMERA FOLL NO PAINT ICUP (DEGR) INITIAL TEMP (DEGR) SQUARE ROOT (RHO/CAR) TRAR(10) BETAITO)  
TOPIT) 8536  
SIF(15) 7494  
MULTIMIR) 7337  
A0 .0486 0 0

ML(9TO)/MREF ML(.923TO) ML(.923TO)/MREF ST(10)

PIC NO TIME DELTIME HITO) HITO)/MREF ML(9TO)  
T 1477(131) 1.18 MODEL HAS NOT REACHED CENTERLINE  
M 7404(131) 1.18 MODEL HAS NOT REACHED CENTERLINE  
R 7413(131) 2.23 MODEL HAS NOT REACHED CENTERLINE  
T 1474(131) 2.25 MODEL HAS NOT REACHED CENTERLINE  
S 5747(131) 2.25 MODEL HAS NOT REACHED CENTERLINE  
INJECT TIME = 2.30  
T 1479(131) 3.20 DATA NOT YET VALID  
S 5749(131) 3.20 DATA NOT YET VALID  
M 7411(131) 3.20 DATA NOT YET VALID  
M 7412(131) 3.26 3.04 1.704E-03 .0414 2.074E-03 .0507 1.974E-03 .0493 1.022E-03  
T 1474(131) 4.28 3.09 1.647E-03 .0415 2.064E-03 .0505 1.964E-03 .0481 1.019E-03  
S 5744(131) 4.28 3.09 1.647E-03 .0415 2.064E-03 .0505 1.964E-03 .0481 1.018E-03  
T 1474(131) 5.43 4.12 1.464E-03 .0394 1.784E-03 .0436 1.700E-03 .0415 8.790E-04  
S 5742(131) 5.43 4.14 1.464E-03 .0394 1.784E-03 .0436 1.700E-03 .0415 8.790E-04  
T 1474(131) 6.48 5.19 1.309E-03 .0379 1.595E-03 .0390 1.514E-03 .0371 7.849E-04  
M 7414(131) 6.48 5.19 1.309E-03 .0379 1.595E-03 .0390 1.514E-03 .0371 7.849E-04  
S 5744(131) 6.48 5.21 1.309E-03 .0379 1.595E-03 .0390 1.514E-03 .0371 7.849E-04  
M 7415(131) 7.53 6.24 1.144E-03 .0292 1.454E-03 .0355 1.384E-03 .0338 7.155E-04  
T 1474(131) 7.56 6.27 1.144E-03 .0292 1.454E-03 .0355 1.384E-03 .0338 7.155E-04  
S 5747(131) 7.56 6.27 1.144E-03 .0292 1.454E-03 .0355 1.384E-03 .0338 7.155E-04  
T 1474(131) 8.61 7.32 1.103E-03 .0299 1.343E-03 .0324 1.274E-03 .0312 6.611E-04  
S 5744(131) 8.61 7.32 1.103E-03 .0299 1.343E-03 .0324 1.274E-03 .0312 6.611E-04  
M 7414(131) 9.66 8.37 1.031E-03 .0292 1.254E-03 .0307 1.195E-03 .0292 6.178E-04

780

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7/10/73

MASA-RI ORBITER PEATING AEDC(AMC-INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL R

VA280

GROUP COMFIG MODEL MACH NO PO(PSTA) TO(DEC R) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREBEND ROLL-MODEL YAW  
 129 2 GREITER S 7.99 600.0 1317 35.03 -5.03 -30.00 -180.00 -0.00

T-1NF P-1NF O-1NF V-1NF RM-1NF MU-1NF RF/FT MRFF STREX  
 (DEC R) (PSTA) (PSIA) (FT/SEC) (SLUGS/FT) (LBS-SEC/FT) (FT-I) (RZ .0175EI) (RZ .0175EI)  
 90.4 .062 2.769 3823 5.435F-04 7.700F-08 2.702E 06 4.005E-02 2.476F-02

CASEA ROLL NO PAINT FPM (DFG F) INITIAL TEMP (DFG F) SQUARE ROOT (RH0ACK) TRAN(10) PETA(10)  
 TOP(1) 8536  
 SIF(1) 7496  
 -H01C-181 7237

PIC NO	TIME DELTIME	H(10)	H(10)/HREF	H(10)	H(10)/HREF	H(10)/HREF	H(10)/HREF	ST(10)
T 1485(131)	9.69 4.30	1.029E-03	.0251	1.254E-03	.0306	1.194E-03	.0291	6.171E-04
S 1490(131)	9.69 8.39	1.029E-03	.0251	1.254E-03	.0306	1.194E-03	.0291	6.171E-04
T 1675(131)	10.74 9.44	9.745E-04	.0237	1.122E-03	.0289	1.125E-03	.0275	5.818E-04
S 1680(131)	10.74 9.44	9.745E-04	.0237	1.122E-03	.0289	1.125E-03	.0275	5.818E-04
M 7414(131)	10.74 9.44	9.745E-04	.0237	1.122E-03	.0289	1.125E-03	.0275	5.818E-04
T 1447(131)	11.79 10.50	9.246F-04	.0225	1.121E-03	.0274	1.067E-03	.0261	5.519E-04
S 1451(131)	11.79 10.50	9.246F-04	.0225	1.121E-03	.0274	1.067E-03	.0261	5.519E-04
M 7413(131)	11.79 10.50	9.246F-04	.0225	1.121E-03	.0274	1.067E-03	.0261	5.519E-04
T 1446(131)	12.85 11.57	9.746F-04	.0214	1.064E-03	.0261	1.017E-03	.0248	5.250E-04
S 1450(131)	12.85 11.57	9.746F-04	.0214	1.064E-03	.0261	1.017E-03	.0248	5.250E-04
M 7412(131)	12.85 11.57	9.746F-04	.0214	1.064E-03	.0261	1.017E-03	.0248	5.250E-04
T 1445(131)	13.92 12.62	9.345E-04	.0205	1.023E-03	.0250	9.733E-04	.0238	5.031F-04
S 1449(131)	13.92 12.62	9.345E-04	.0205	1.023E-03	.0250	9.733E-04	.0238	5.031F-04
M 7421(131)	13.92 12.62	9.345E-04	.0205	1.023E-03	.0250	9.733E-04	.0238	5.031F-04
T 1444(131)	14.97 13.67	8.055E-04	.0197	9.425E-04	.0240	9.351E-04	.0228	4.834E-04
S 1448(131)	14.97 13.67	8.055E-04	.0197	9.425E-04	.0240	9.351E-04	.0228	4.834E-04
M 7420(131)	14.97 13.67	8.055E-04	.0197	9.425E-04	.0240	9.351E-04	.0228	4.834E-04
T 1443(131)	16.04 14.75	7.746F-04	.0190	9.446E-04	.0231	9.004E-04	.0220	4.652E-04
S 1447(131)	16.04 14.75	7.746F-04	.0190	9.446E-04	.0231	9.004E-04	.0220	4.652E-04
M 7419(131)	16.04 14.75	7.746F-04	.0190	9.446E-04	.0231	9.004E-04	.0220	4.652E-04
T 1442(131)	17.09 15.83	7.523E-04	.0183	9.140E-04	.0223	8.694E-04	.0212	4.491E-04
S 1446(131)	17.09 15.83	7.523E-04	.0183	9.140E-04	.0223	8.694E-04	.0212	4.491E-04
M 7418(131)	17.09 15.83	7.523E-04	.0183	9.140E-04	.0223	8.694E-04	.0212	4.491E-04
T 1441(131)	18.15 16.85	7.265F-04	.0177	8.850E-04	.0216	8.424E-04	.0206	4.351F-04
S 1445(131)	18.15 16.85	7.265F-04	.0177	8.850E-04	.0216	8.424E-04	.0206	4.351F-04
M 7417(131)	18.15 16.85	7.265F-04	.0177	8.850E-04	.0216	8.424E-04	.0206	4.351F-04
T 1440(131)	19.17 17.88	7.260F-04	.0177	8.441E-04	.0215	8.417E-04	.0205	4.349E-04
S 1444(131)	19.17 17.88	7.260F-04	.0177	8.441E-04	.0215	8.417E-04	.0205	4.349E-04
M 7416(131)	19.17 17.88	7.260F-04	.0177	8.441E-04	.0215	8.417E-04	.0205	4.349E-04

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 • UNCLASSIFIED •  
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7/10/73

044294

AEOC(ARO, INC.) ARNOLD AFS, TENNESSEE  
VON KARMAN GAS DYNAMICS FACILITY  
50 INCH HYPERSONIC TUNNEL B

5 1/2 INCH HYPERSONIC TUNNEL A

GROUP	CONFID	MODEL	MACH NO	PO(PSIA)	TO(DEG M)	ALPHA-MODEL	ALPHA-SECTOR	ALPHA-PREBEND	ROLL-MODEL	YAW
129	2	ORBITER S	7.99	400.2	1317	35.03	-5.03	-30.00	-180.00	-0.00

[illegible]

Series	Value	Unit
Series 1	6.567E+02	6.1369E+02
Series 2	7496	1.51
Series 3	8538	1.51

• 7476

99

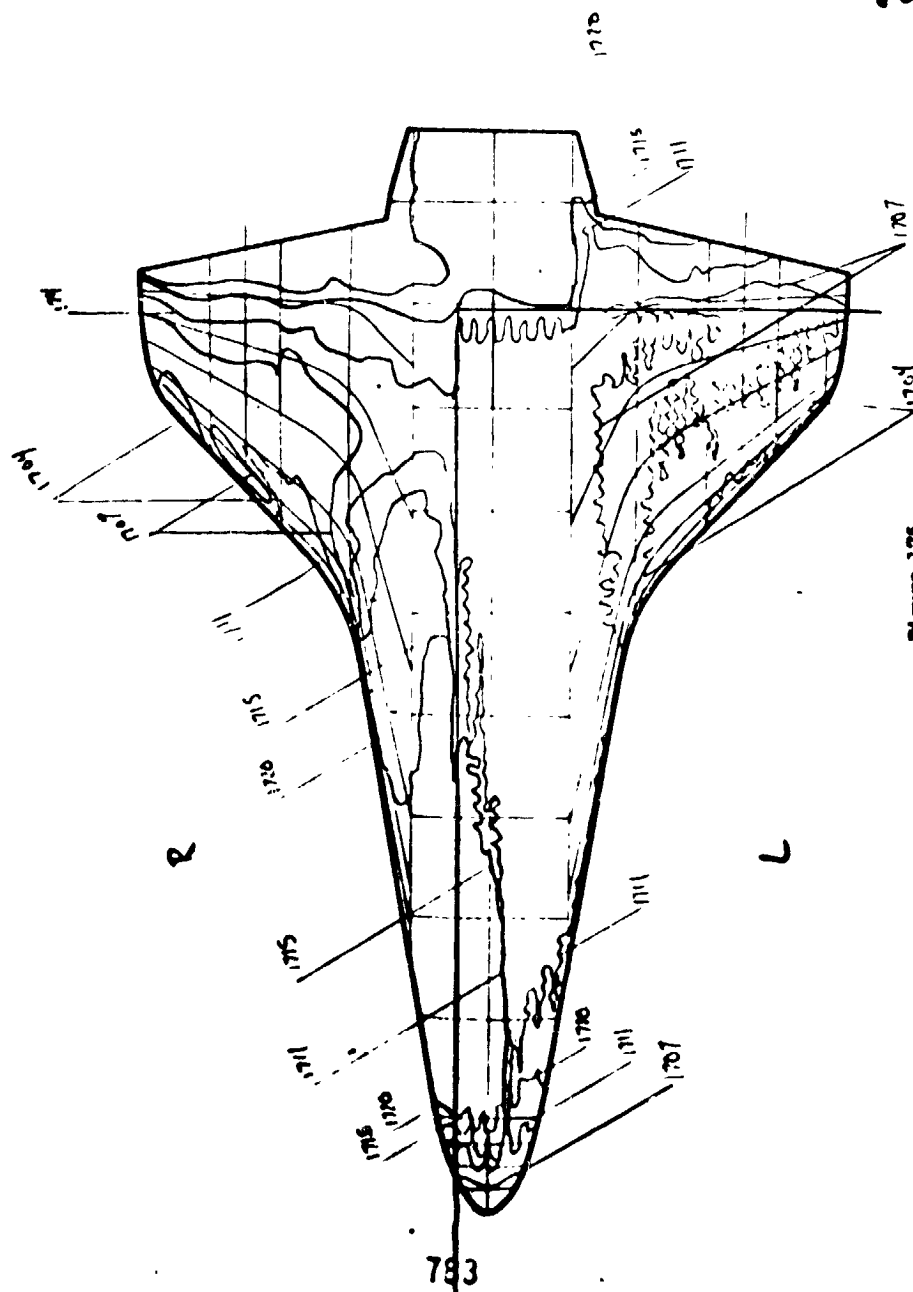
PIC NO	LINE	RELTYPE	M(T0)	M(T0)/HREF	M(L0)	M(L0)/HREF	M(L0T0)/HREF	M(L0T0)/HREF	SY(T0)
1	1-04(131)	19-22	17-93	7-044F-04	0-172	0-0210	8-167E-04	0-0199	4-221E-04
2	1-04(131)	19-22	17-93	7-044F-04	0-172	0-0210	8-167E-04	0-0199	4-221E-04
3	1-04(131)	19-22	17-93	7-044F-04	0-172	0-0210	8-167E-04	0-0199	4-221E-04
4	1-04(131)	19-22	17-93	7-044F-04	0-172	0-0210	8-167E-04	0-0199	4-221E-04
5	1-04(131)	20-27	18-98	6-8-66F-04	0-167	0-204	7-037E-04	0-194	4-099E-04
6	1-04(131)	20-27	18-98	6-8-66F-04	0-167	0-204	7-037E-04	0-194	4-099E-04
7	1-04(131)	20-27	18-98	6-8-66F-04	0-167	0-204	7-037E-04	0-194	4-099E-04
8	1-04(131)	20-27	18-98	6-8-66F-04	0-167	0-204	7-037E-04	0-194	4-099E-04
9	1-04(131)	20-27	18-98	6-8-66F-04	0-167	0-204	7-037E-04	0-194	4-099E-04
10	1-04(131)	21-35	20-04	6-6-50F-04	0-163	0-198	7-722E-04	0-188	3-989E-04
11	1-04(131)	21-35	20-04	6-6-50F-04	0-163	0-198	7-722E-04	0-188	3-989E-04
12	1-04(131)	21-35	20-04	6-6-50F-04	0-163	0-198	7-722E-04	0-188	3-989E-04
13	1-04(131)	21-35	20-04	6-6-50F-04	0-163	0-198	7-722E-04	0-188	3-989E-04
14	1-04(131)	22-40	21-11	6-4-47F-04	0-154	0-193	7-527E-04	0-184	3-889E-04
15	1-04(131)	22-40	21-11	6-4-47F-04	0-154	0-193	7-527E-04	0-184	3-889E-04
16	1-04(131)	22-40	21-11	6-4-47F-04	0-154	0-193	7-527E-04	0-184	3-889E-04
17	1-04(131)	22-40	21-11	6-4-47F-04	0-154	0-193	7-527E-04	0-184	3-889E-04
18	1-04(131)	22-40	21-11	6-4-47F-04	0-154	0-193	7-527E-04	0-184	3-889E-04
19	1-04(131)	23-48	22-18	6-3-12F-04	0-155	0-188	7-342E-04	0-179	3-791E-04
20	1-04(131)	23-48	22-18	6-3-12F-04	0-155	0-188	7-342E-04	0-179	3-791E-04
21	1-04(131)	23-48	22-18	6-3-12F-04	0-155	0-188	7-342E-04	0-179	3-791E-04
22	1-04(131)	23-48	22-18	6-3-12F-04	0-155	0-188	7-342E-04	0-179	3-791E-04
23	1-04(131)	24-53	23-24	6-1-14F-04	0-154	0-188	7-174E-04	0-175	3-702E-04
24	1-04(131)	24-53	23-24	6-1-14F-04	0-154	0-188	7-174E-04	0-175	3-702E-04
25	1-04(131)	24-53	23-24	6-1-14F-04	0-154	0-188	7-174E-04	0-175	3-702E-04
26	1-04(131)	24-53	23-24	6-1-14F-04	0-154	0-188	7-174E-04	0-175	3-702E-04
27	1-04(131)	24-53	23-24	6-1-14F-04	0-154	0-188	7-174E-04	0-175	3-702E-04
28	1-04(131)	24-53	23-24	6-1-14F-04	0-154	0-188	7-174E-04	0-175	3-702E-04
29	1-04(131)	24-53	23-24	6-1-14F-04	0-154	0-188	7-174E-04	0-175	3-702E-04
30	1-04(131)	24-53	23-24	6-1-14F-04	0-154	0-188	7-174E-04	0-175	3-702E-04
31	1-04(131)	24-53	23-24	6-1-14F-04	0-154	0-188	7-174E-04	0-175	3-702E-04
32	1-04(131)	24-53	23-24	6-1-14F-04	0-154	0-188	7-174E-04	0-175	3-702E-04
33	1-04(131)	24-53	23-24	6-1-14F-04	0-154	0-188	7-174E-04	0-175	3-702E-04
34	1-04(131)	24-53	23-24	6-1-14F-04	0-154</				

495

REPRODUCIBILITY OF THE ORIGINAL PAGE IS POOR.

Group 130  
8536  
NO

8598  
 $\theta = 35^\circ$   
 $\phi = 0^\circ$



# WASABI COMPUTER READING

REDCI(ARN,INC.) ARNOLD AFS, TENNESSEE  
VON KARMAN GAS DYNAMICS FACILITY  
50 INCH HYPERSONIC TUNNEL A

54295

CARTRIDGE	CONFIG	MODEL	MACH NO	POT(PSTIA)	TOT(DEC P)	ALPHA-MODEL	ALPHA-SECTION	ALPHA-PREPEND	ROLL-MODEL	YAW
139	6	CR117EM H3	7.94	600.6	131B	35.03	-5.03	-30.00	-180.00	-0.00
90.7	.002	2.771	3M30	50.837E-05	2.705F DM	W/F/FI	HREF	STREF		
			(FT/SEC)	(SLUGS/FT <sup>3</sup> )	(LBS-SEC/FI <sup>2</sup> )	(FI-1)	(R= .0175FI)	(R= .0175FI)		
							(R= .0175FI)	(R= .0175FI)		
								2.476F-02		

CAMERA	HOLL NO	PAINT	IFWP (DEG F)	INITIAL TEMP (DEG F)	SQUARE ROOT (RHOXCAK)	TRAN(TU)	BETA(TO)
1	1	1	1	1	1	1	1

0.0555 0 0

Wt %	Time	$M(10)$	$M(10)/M_{REF}$	$M(910)$	$M(910)/M_{REF}$	$M(92310)$	$M(92310)/M_{REF}$	ST(YO)
0	0	100	1.00	100	1.00	100	1.00	0
10	10	95	0.95	95	0.95	95	0.95	10
20	20	90	0.90	90	0.90	90	0.90	20
30	30	85	0.85	85	0.85	85	0.85	30
40	40	80	0.80	80	0.80	80	0.80	40
50	50	75	0.75	75	0.75	75	0.75	50
60	60	70	0.70	70	0.70	70	0.70	60
70	70	65	0.65	65	0.65	65	0.65	70
80	80	60	0.60	60	0.60	60	0.60	80
90	90	55	0.55	55	0.55	55	0.55	90
100	100	50	0.50	50	0.50	50	0.50	100

SIZE (mm)	TYPE	RELTYPE	MODEL	M-100/MECH	M-1910C
7	1700 (400)	1-10	MODEL WAS NOT REACHED	CENTERLINE	
8	7432 (400)	1-10	MODEL WAS NOT REACHED	CENTERLINE	
9	5414 (400)	1-10	MODEL WAS NOT REACHED	CENTERLINE	
10	7433 (500)	2-23	MODEL WAS NOT REACHED	CENTERLINE	
11	1701 (400)	2-25	MODEL WAS NOT REACHED	CENTERLINE	
12	5415 (400)	2-25	MODEL WAS NOT REACHED	CENTERLINE	

DATA	NOT	YES	VAL	ID
DATA <td>NOT <td>YES <td>VAL <td>ID</td> </td></td></td>	NOT <td>YES <td>VAL <td>ID</td> </td></td>	YES <td>VAL <td>ID</td> </td>	VAL <td>ID</td>	ID
DATA <td>NOT <td>YES <td>VAL <td>ID</td> </td></td></td>	NOT <td>YES <td>VAL <td>ID</td> </td></td>	YES <td>VAL <td>ID</td> </td>	VAL <td>ID</td>	ID

[illegible]

• CLASSIFIED •

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 • UNCLASSIFIED •  
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7/10/73

MA-8-01 ORBITER PLATING  
 VA289  
 AEDC(ARO-TAC) ARNOU AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL 4

GROUP CONFIG MODEL MACH NO ORIP(SIA) TO(DEC R) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREBEND ROLL-MODEL YAW  
 138 A ORBITER B3 7.00 401.3 1317 35.03 -5.03 -30.00 -100.00 -0.00

T-INF P-INF Q-INF V-INF W-INF MU-INF HE/FT MREF STREF  
 (DEC R) (P(SIA) (Q(SIA) (V(SIA) (W(SIA) (SLUGS/FT) (LBS-SEC/FT) (FT-LB) (R= .0175E) (R= .0175E) (R= .0175E)  
 95.7 .462 2.775 3030 5.444E-04 7.704E-08 2.706E 06 4.100E-02 2.474E-02

CAMERA ROLL NO PAINT (F-P) INITIAL TEMP (DEG F) SQUARE ROOT (RM(CACX)) TBAH(TC) BETA(TO)  
 TOP(1) 8536  
 SLOC(S) 7494  
 MOTION(M) 7237  
 400 40  
 .0555 4.116E-01 5.5530E-01

PIC NO	TIME	DELTIME	M(TO)	M(TO)/MREF	M(LQTO)	M(LQTO)/MREF	M(LQTO)	M(LQTO)/MREF	M(LQTO)	M(LQTO)/MREF	ST(TO)
1	1704(400)	10.71	9.41	1.005E-02	1.378E-02	.330	1.262E-02	.3079	5.924E-03		
2	5421(400)	10.71	9.41	1.005E-02	1.378E-02	.330	1.262E-02	.3079	5.924E-03		
3	7441(400)	10.71	9.41	1.005E-02	1.378E-02	.330	1.262E-02	.3079	5.924E-03		
4	7442(400)	11.16	10.44	9.511E-03	1.299E-02	.3147	1.197E-02	.2919	5.616E-03		
5	1710(400)	11.19	10.48	9.519E-03	1.297E-02	.3144	1.196E-02	.2917	5.612E-03		
6	5424(400)	11.19	10.48	9.519E-03	1.297E-02	.3144	1.196E-02	.2917	5.612E-03		
7	1711(400)	12.64	11.53	9.075E-03	1.237E-02	.3016	1.140E-02	.2780	5.349E-03		
8	5425(400)	12.64	11.53	9.075E-03	1.237E-02	.3016	1.140E-02	.2780	5.349E-03		
9	7443(400)	12.64	11.53	9.075E-03	1.237E-02	.3016	1.140E-02	.2780	5.349E-03		
10	7444(400)	12.64	11.53	9.075E-03	1.237E-02	.3016	1.140E-02	.2780	5.349E-03		
11	5426(400)	13.69	12.54	8.644E-03	1.144E-02	.2848	1.091E-02	.2662	5.121E-03		
12	5427(400)	13.69	12.54	8.644E-03	1.144E-02	.2848	1.091E-02	.2662	5.121E-03		
13	7445(400)	13.69	12.54	8.644E-03	1.144E-02	.2848	1.091E-02	.2662	5.121E-03		
14	7446(400)	14.57	13.64	8.345E-03	1.134E-02	.2774	1.084E-02	.2557	4.919E-03		
15	5428(400)	14.57	13.64	8.345E-03	1.134E-02	.2774	1.084E-02	.2557	4.919E-03		
16	5429(400)	14.57	13.64	8.345E-03	1.134E-02	.2774	1.084E-02	.2557	4.919E-03		
17	7447(400)	15.59	14.69	8.042E-03	1.094E-02	.2672	1.010E-02	.2443	4.738E-03		
18	1714(400)	15.59	14.71	8.042E-03	1.094E-02	.2672	1.010E-02	.2443	4.738E-03		
19	5430(400)	16.02	14.71	8.042E-03	1.094E-02	.2672	1.010E-02	.2443	4.738E-03		
20	5431(400)	16.02	14.71	8.042E-03	1.094E-02	.2672	1.010E-02	.2443	4.738E-03		
21	7448(400)	17.07	15.74	7.762E-03	1.054E-02	.2540	9.752E-03	.2378	4.575E-03		
22	5432(400)	17.07	15.74	7.762E-03	1.054E-02	.2540	9.752E-03	.2378	4.575E-03		
23	7449(400)	17.07	15.74	7.762E-03	1.054E-02	.2540	9.752E-03	.2378	4.575E-03		
24	5433(400)	17.07	15.74	7.762E-03	1.054E-02	.2540	9.752E-03	.2378	4.575E-03		
25	7450(400)	18.12	16.81	7.516E-03	1.024E-02	.2408	9.442E-03	.2303	4.430E-03		
26	5434(400)	18.12	16.81	7.516E-03	1.024E-02	.2408	9.442E-03	.2303	4.430E-03		
27	1715(400)	18.15	16.84	7.516E-03	1.024E-02	.2408	9.442E-03	.2303	4.430E-03		
28	5435(400)	18.15	16.84	7.516E-03	1.024E-02	.2408	9.442E-03	.2303	4.430E-03		
29	7451(400)	19.15	17.84	7.247E-03	9.945E-03	.2425	9.166E-03	.2236	4.302E-03		
30	5436(400)	19.15	17.84	7.247E-03	9.945E-03	.2425	9.166E-03	.2236	4.302E-03		
31	7452(400)	19.15	17.84	7.247E-03	9.945E-03	.2425	9.166E-03	.2236	4.302E-03		

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WIC NO	TIME (ELTIME)	W(10)	W(10)/WREF	W(210)	M(0.910)/WREF	M(0.910)/WREF	M(0.92310)/WREF	ST(10)
1	171.1400	20.20	18.40	7.031E-03	0.1729	9.664E-03	8.908E-03	4.178E-03
2	172.1400	20.20	18.40	7.031E-03	0.1729	9.664E-03	8.908E-03	4.178E-03
3	173.1400	20.22	15.92	7.035E-03	0.1728	9.655E-03	8.905E-03	4.175E-03
4	174.1400	21.07	16.97	6.975E-03	0.1432	9.402E-03	8.664E-03	4.065E-03
5	175.1400	21.07	16.97	6.975E-03	0.1432	9.402E-03	8.664E-03	4.065E-03
6	176.1400	21.27	17.07	6.975E-03	0.1432	9.402E-03	8.664E-03	4.065E-03
7	177.1400	22.23	21.05	6.972E-03	0.1430	9.162E-03	8.445E-03	3.961E-03
8	178.1400	22.23	21.05	6.972E-03	0.1430	9.162E-03	8.445E-03	3.961E-03
9	179.1400	22.25	21.04	6.971E-03	0.1434	9.162E-03	8.440E-03	3.959E-03
10	180.1400	22.27	22.07	6.955E-03	0.1593	8.941E-03	8.241E-03	3.865E-03
11	179.1400	22.27	22.07	6.955E-03	0.1593	8.941E-03	8.241E-03	3.865E-03
12	180.1400	22.27	22.07	6.955E-03	0.1593	8.941E-03	8.241E-03	3.865E-03
13	181.1400	22.27	22.07	6.955E-03	0.1593	8.941E-03	8.241E-03	3.865E-03
14	182.1400	22.27	22.07	6.955E-03	0.1593	8.941E-03	8.241E-03	3.865E-03
15	183.1400	22.27	22.07	6.955E-03	0.1593	8.941E-03	8.241E-03	3.865E-03
16	184.1400	22.27	22.07	6.955E-03	0.1593	8.941E-03	8.241E-03	3.865E-03
17	185.1400	22.27	22.07	6.955E-03	0.1593	8.941E-03	8.241E-03	3.865E-03
18	186.1400	22.27	22.07	6.955E-03	0.1593	8.941E-03	8.241E-03	3.865E-03
19	187.1400	22.27	22.07	6.955E-03	0.1593	8.941E-03	8.241E-03	3.865E-03
20	188.1400	22.27	22.07	6.955E-03	0.1593	8.941E-03	8.241E-03	3.865E-03
21	189.1400	22.27	22.07	6.955E-03	0.1593	8.941E-03	8.241E-03	3.865E-03
22	190.1400	22.27	22.07	6.955E-03	0.1593	8.941E-03	8.241E-03	3.865E-03
23	191.1400	22.27	22.07	6.955E-03	0.1593	8.941E-03	8.241E-03	3.865E-03
24	192.1400	22.27	22.07	6.955E-03	0.1593	8.941E-03	8.241E-03	3.865E-03
25	193.1400	22.27	22.07	6.955E-03	0.1593	8.941E-03	8.241E-03	3.865E-03
26	194.1400	22.27	22.07	6.955E-03	0.1593	8.941E-03	8.241E-03	3.865E-03
27	195.1400	22.27	22.07	6.955E-03	0.1593	8.941E-03	8.241E-03	3.865E-03
28	196.1400	22.27	22.07	6.955E-03	0.1593	8.941E-03	8.241E-03	3.865E-03
29	197.1400	22.27	22.07	6.955E-03	0.1593	8.941E-03	8.241E-03	3.865E-03
30	198.1400	22.27	22.07	6.955E-03	0.1593	8.941E-03	8.241E-03	3.865E-03
31	199.1400	22.27	22.07	6.955E-03	0.1593	8.941E-03	8.241E-03	3.865E-03
32	200.1400	22.27	22.07	6.955E-03	0.1593	8.941E-03	8.241E-03	3.865E-03
33	201.1400	22.27	22.07	6.955E-03	0.1593	8.941E-03	8.241E-03	3.865E-03
34	202.1400	22.27	22.07	6.955E-03	0.1593	8.941E-03	8.241E-03	3.865E-03
35	203.1400	22.27	22.07	6.955E-03	0.1593	8.941E-03	8.241E-03	3.865E-03
36	204.1400	22						



REPRODUCIBILITY OF THE ORIGINAL PAGE IS POOR.

131  
6-8536

1555  
 $\sigma = 35^\circ$   
 $\phi = 0^\circ$

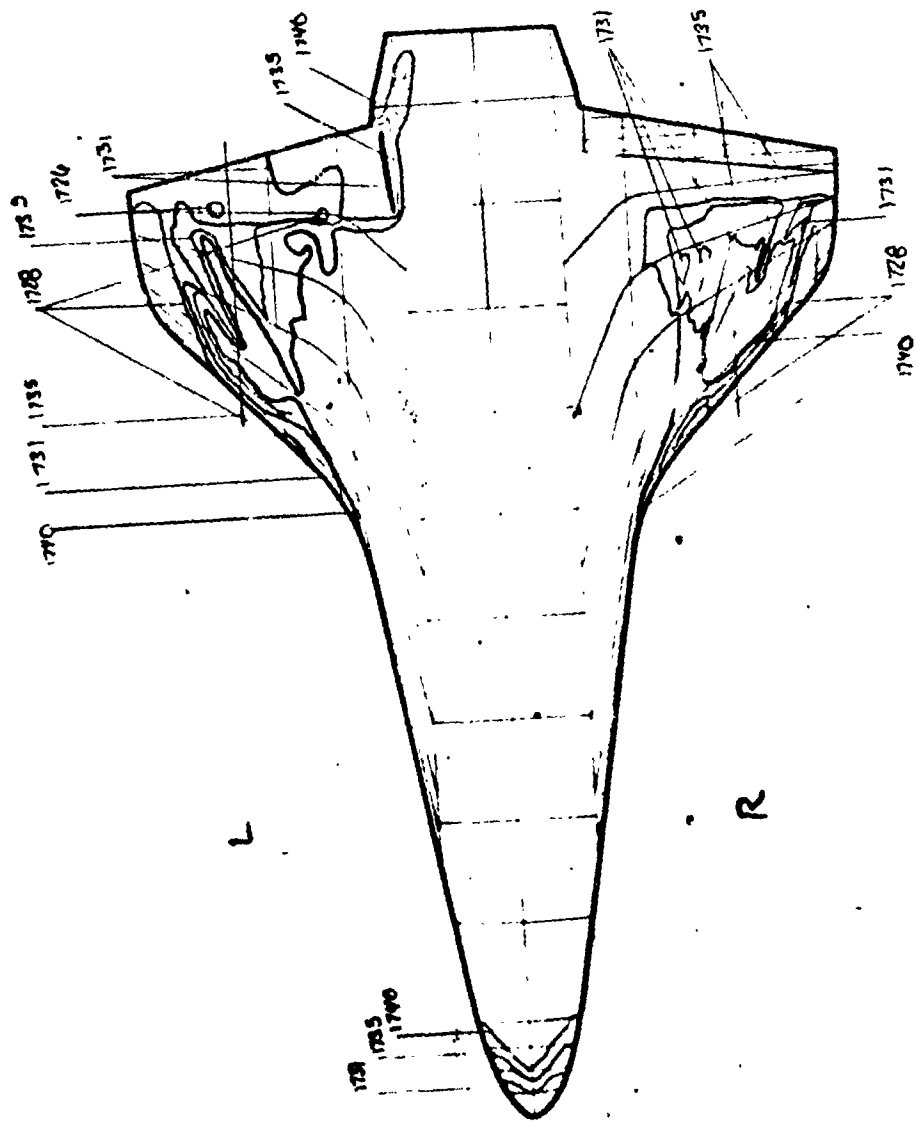


Figure 176

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7/10/73

AEDC(AWD-INC.) ARNOLD AFS, TENNESSEE  
VON KAPLAN GAS DYNAMICS FACILITY  
50 INCH HYPERSONIC TUNNEL 9

NASA-RI ORBITER HEATING

VA299

GROUP	CONFIG	MODEL	MACH NO	PO(PSTIA)	TO(DEC R)	ALPHA-MODEL	ALPHA-SECTOR	ALPHA-PREBEND	ROLL-MODEL	YAW
131	3	ORBITER E	7.99	600.7	1318	35.02	-5.02	-30.00	-180.00	-0.00
T-1NF	P-1NF	O-1NF	V-1NF	RHO-1NF	MU-1NF	RF/FT	HRFF	SIREF		
(DEG R)	(PSTIA)	(FT/SEC)	(FT/SEC)	(SLUGS/FT <sup>3</sup> )	(LB-SEC/FT <sup>3</sup> )	(FT-1)	(9= .0175, 1)	(M= .0175E1)		
95.7	0.62	2.772	3831	5.435E-05	7.709E-08	2.701E 06	4.099E-02	2.476E-02		
CAMERA	MOLL NO	PAINT IFMP (DEG F)	INITIAL TEMP (DEG F)	SQUARE ROOT (RHOACXK)	TBAR(10)	BETA(10)				
TOP(T)	8536		92	.0553	0	0				
SIZE(S)	7496	450								
WOTTCM(R)	7237									

PIC NO	TIME DELTIME	H(10)	H(10)/HREF	H(.910)	H(.92310)	H(.92310)/HREF	ST(10)
1 1723(450)	1.18	MODEL HAS NOT REACHED CENTERLINE					
5 5437(450)	1.18	MODEL HAS NOT REACHED CENTERLINE					
1 1724(450)	2.23	MODEL HAS NOT REACHED CENTERLINE					
5 5434(450)	2.23	MODEL HAS NOT REACHED CENTERLINE					
1 1727(450)	2.23	MODEL HAS NOT REACHED CENTERLINE					
5 5434(450)	2.23	MODEL HAS NOT REACHED CENTERLINE					
INJECT TIME *	2.30						
1 1725(450)	3.28	DATA NOT YET VALID					
5 5434(450)	3.28	DATA NOT YET VALID					
1 1724(450)	4.23	3.159E-02	.5419	2.159E-02	.7704	2.875E-02	.7011
5 5437(450)	4.23	3.144E-02	.5397	3.144E-02	.7673	2.863E-02	.6982
1 1724(450)	4.26	2.213E-02	.5397	2.213E-02	.7673	2.863E-02	.6982
5 5437(450)	4.26	2.213E-02	.5397	2.213E-02	.7673	2.863E-02	.6982
1 1727(450)	5.41	1.979E-02	.4656	2.714E-02	.6619	2.470E-02	.6023
5 5437(450)	5.41	1.979E-02	.4656	2.714E-02	.6619	2.470E-02	.6023
1 1724(450)	5.41	1.979E-02	.4656	2.714E-02	.6619	2.470E-02	.6023
5 5437(450)	5.41	1.979E-02	.4656	2.714E-02	.6619	2.470E-02	.6023
1 1724(450)	6.46	1.774E-02	.4156	2.423E-02	.5908	2.204E-02	.5376
5 5437(450)	6.46	1.774E-02	.4156	2.423E-02	.5908	2.204E-02	.5376
1 1724(450)	6.46	1.774E-02	.4156	2.423E-02	.5908	2.204E-02	.5376
5 5437(450)	6.46	1.774E-02	.4156	2.423E-02	.5908	2.204E-02	.5376
1 1724(450)	7.51	1.550E-02	.3740	2.204E-02	.5376	2.005E-02	.4890
5 5437(450)	7.51	1.550E-02	.3740	2.204E-02	.5376	2.005E-02	.4890
1 1724(450)	7.53	1.550E-02	.3740	2.204E-02	.5376	2.005E-02	.4890
5 5437(450)	7.53	1.550E-02	.3740	2.204E-02	.5376	2.005E-02	.4890
1 1730(450)	8.58	1.434E-02	.3497	2.039E-02	.4971	1.855E-02	.4524
5 5437(450)	8.58	1.434E-02	.3497	2.039E-02	.4971	1.855E-02	.4524
1 1730(450)	8.58	1.434E-02	.3497	2.039E-02	.4971	1.855E-02	.4524
5 5437(450)	8.58	1.434E-02	.3497	2.039E-02	.4971	1.855E-02	.4524
1 1731(450)	9.64	1.341E-02	.3269	1.906E-02	.4648	1.734E-02	.4229
5 5437(450)	9.64	1.341E-02	.3269	1.906E-02	.4648	1.734E-02	.4229
1 1731(450)	9.64	1.341E-02	.3269	1.906E-02	.4648	1.734E-02	.4229
5 5437(450)	9.64	1.341E-02	.3269	1.906E-02	.4648	1.734E-02	.4229

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7/10/73

AEDC(ARO, INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL R

NASA-RI ORBITER HEATING

04299

WRNIP COMPIC MODEL MACH NO PO(PSTA) TO(DEG R) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREBEND ROLL-MODEL YAW  
 131 3 ORBITER E 7.99 601.4 131R 35.02 -5.02 -30.00 -180.00 -0.00

T-TAF P-INF Q-INF V-INF MU-INF RMG-INF MU-INF MREF STREF  
 (DEG R) (PSIA) (PSIA) (PSIA) (FT/SEC) (SLUGS/FT<sup>2</sup>) (L<sup>2</sup>-SEC/FT<sup>2</sup>) (FT-1) (R= .0175FT) (R= .0175FT)  
 95.7 .062 2.775 3931 5.443E-05 1.707E-08 2.705E-06 4.101E-02 2.474E-02

CAMERA HOLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RMXCKK) TRAR(TO) BETA(TO)

TOP(T) 8536  
 SINF(S) 7496  
 MOTTCR(R) 7337

4.742E-01 7.0029E-01

.0553

PIC NO	TIME DELTIME	M(TO)	MREF	M(OTD)	M(OTD)/MREF	M(OTD)/MREF	M(OTD)/MREF	ST(TO)
T 1732(450)	10.69	9.39	1.263E-02	1.796E-02	.3379	1.635E-02	.3985	7.427E-03
M 7654(450)	10.69	9.39	1.263E-02	1.796E-02	.3381	1.635E-02	.3985	7.427E-03
S 5444(450)	10.71	9.42	1.262E-02	1.795E-02	.3377	1.632E-02	.3980	7.417E-03
T 1733(450)	11.76	10.47	1.197E-02	1.701E-02	.2914	1.548E-02	.3775	7.035E-03
S 5447(450)	11.76	10.47	1.197E-02	1.701E-02	.2914	1.548E-02	.3775	7.035E-03
M 7655(450)	11.76	10.47	1.197E-02	1.701E-02	.2914	1.548E-02	.3775	7.035E-03
T 1734(450)	12.81	11.52	1.161E-02	1.622E-02	.2781	1.476E-02	.3598	6.705E-03
S 5448(450)	12.81	11.52	1.161E-02	1.622E-02	.2781	1.476E-02	.3598	6.705E-03
M 7656(450)	12.81	11.52	1.161E-02	1.622E-02	.2781	1.476E-02	.3598	6.705E-03
T 1735(450)	13.87	12.57	1.042E-02	1.533E-02	.2663	1.413E-02	.3445	6.421E-03
S 5449(450)	13.87	12.57	1.042E-02	1.533E-02	.2663	1.413E-02	.3445	6.421E-03
M 7657(450)	13.87	12.57	1.042E-02	1.533E-02	.2663	1.413E-02	.3445	6.421E-03
T 1736(450)	14.54	13.65	1.041E-02	1.531E-02	.2661	1.411E-02	.3442	6.416E-03
S 5450(450)	14.54	13.65	1.041E-02	1.531E-02	.2655	1.354E-02	.3366	6.160E-03
M 7658(450)	14.54	13.65	1.041E-02	1.531E-02	.2655	1.354E-02	.3366	6.160E-03
T 1737(450)	15.59	14.74	1.010E-02	1.436E-02	.2463	1.307E-02	.3186	5.931E-03
S 5451(450)	15.59	14.74	1.010E-02	1.436E-02	.2463	1.307E-02	.3186	5.931E-03
M 7659(450)	15.59	14.74	1.010E-02	1.436E-02	.2463	1.307E-02	.3186	5.931E-03
T 1738(450)	16.02	14.74	1.009E-02	1.435E-02	.2461	1.306E-02	.3183	5.930E-03
S 5452(450)	17.07	15.74	9.757E-03	1.347E-02	.2377	1.261E-02	.3077	5.733E-03
M 7660(450)	17.07	15.74	9.757E-03	1.347E-02	.2377	1.261E-02	.3075	5.729E-03
T 1739(450)	18.12	16.83	9.440E-03	1.342E-02	.2302	1.221E-02	.3075	5.729E-03
S 5453(450)	18.12	16.83	9.440E-03	1.342E-02	.2302	1.221E-02	.3077	5.729E-03
M 7661(450)	18.12	16.83	9.440E-03	1.342E-02	.2302	1.221E-02	.3077	5.729E-03
T 1740(450)	19.17	17.84	9.159E-03	1.302E-02	.2233	1.185E-02	.2884	5.382E-03
S 5454(450)	19.17	17.84	9.159E-03	1.302E-02	.2233	1.185E-02	.2884	5.382E-03
M 7662(450)	19.17	17.84	9.159E-03	1.302E-02	.2233	1.185E-02	.2884	5.382E-03

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7/10/73

**NASA-HI ORBITER HEATING**

EDC(ARO,INC.) ARNOLD AFS, TENNESSEE  
VON KARMAN GAS DYNAMICS FACILITY  
50 INCH HYPERSONIC TUNNEL A

b6  
b7C  
b7D

GROUP	CONFIG	MODEL	MACH NO	P0(P(SIA)	T0(DEG R)	ALPHA-MODEL	ALPHA-SECTOR	ALPHA-PREBEND	ROLL-MODEL	YAW
131	3	GREITER E	7.99	601.7	1318	35.02	-5.02	-30.00	-180.00	--.00
I-INF	P-INF	Q-INF	V-INF	RHO-INF	KU-INF	RF/FT	HREF	STREF		
(DEG R)	(PSIA)	(PSIA)	(FT/SEC)	(SLUGS/FT <sup>3</sup> )	(LB-SEC/FT <sup>2</sup> )	(FT-L)	(R= .0175FI)	(R= .0175FI)		
95.7	.062	2.777	3831	5.445E-05	7.704F-08	2.706E 06	4.102E-02	2.474E-02		
CAMERA	KOLL NO	PAINT	IFMP	(DEG F)	INITIAL TEMP	(DEG F)	SQUARE ROOT	(RHOCACK)	TRAH(TO)	BETA'TO)
TOP(T)	8536									
SIDE(S)	7496		450							
MOTION(M)	7237				82		.0553		4.742E-01	7.0029E-01

PTC NO	TIME	DELTIME	M(TO)	M(TO)/HREF	M(.970)	M(.923TO)/HREF	M(.923TO)/HREF	ST(TO)
S 5454(450)	19.20	17.90	9.152F-03	.9231	1.301E-02	.3172	.2886	5.377E-03
	19.57		MODEL WAS LEFT CENTERLINE					
M 7473(450)	20.22	18.93	9.901F-03	.2170	1.265E-02	.3084		
I 1741(450)	20.25	18.94	9.845F-03	.2169	1.265E-02	.3082	1.151E-02	5.230E-03
S 5455(450)	20.25	19.94	9.845F-03	.2169	1.265E-02	.3082	1.151E-02	5.226E-03
I 1742(450)	21.30	20.01	9.648F-03	.2110	1.231E-02	.3000	1.120E-02	5.086E-03
S 5454(450)	21.30	20.01	9.658F-03	.2110	1.231E-02	.3000	1.120E-02	5.086E-03
M 7474(450)	21.30	20.01	9.658F-03	.2110	1.231E-02	.3000	1.120E-02	5.086E-03

REPRODUCIBILITY OF THE ORIGINAL PAGE IS POOR.

Group 132  
8537  
m

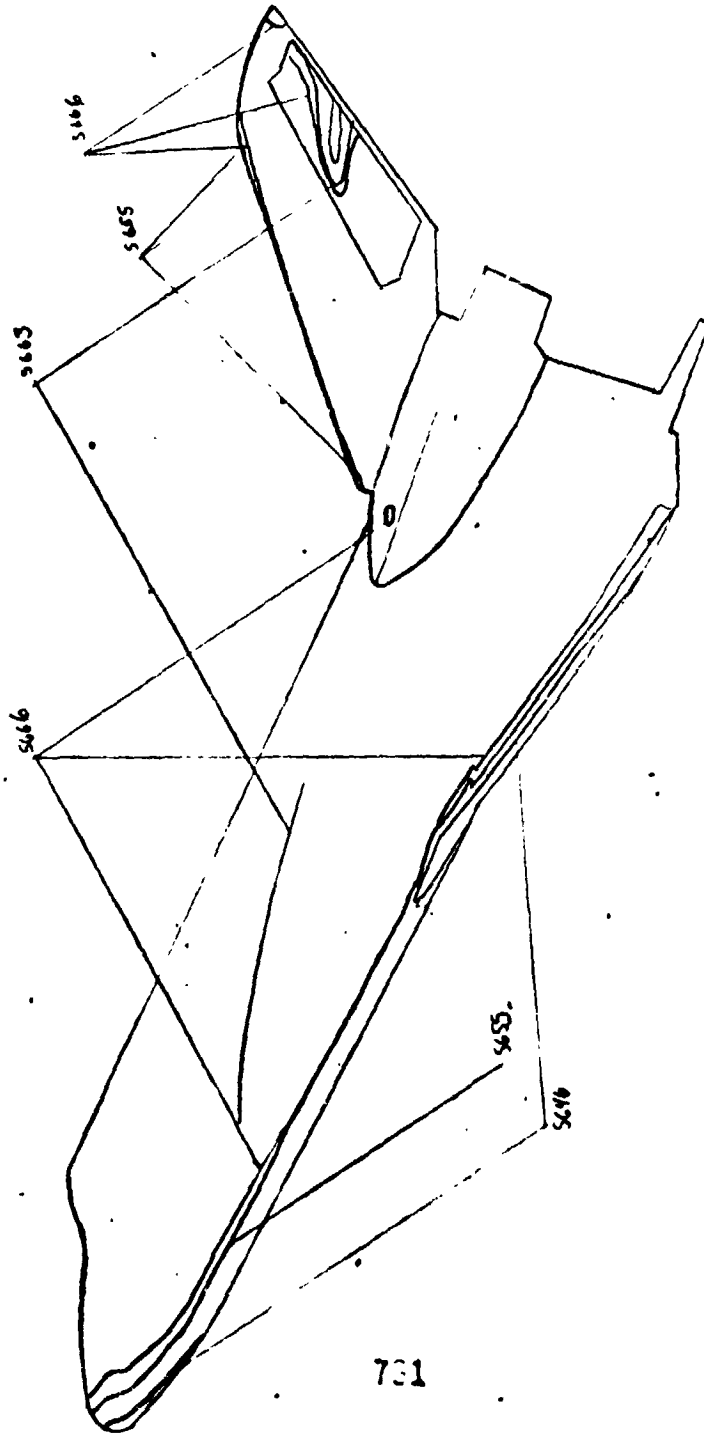


Figure 177

Group 132  
7482  
MD

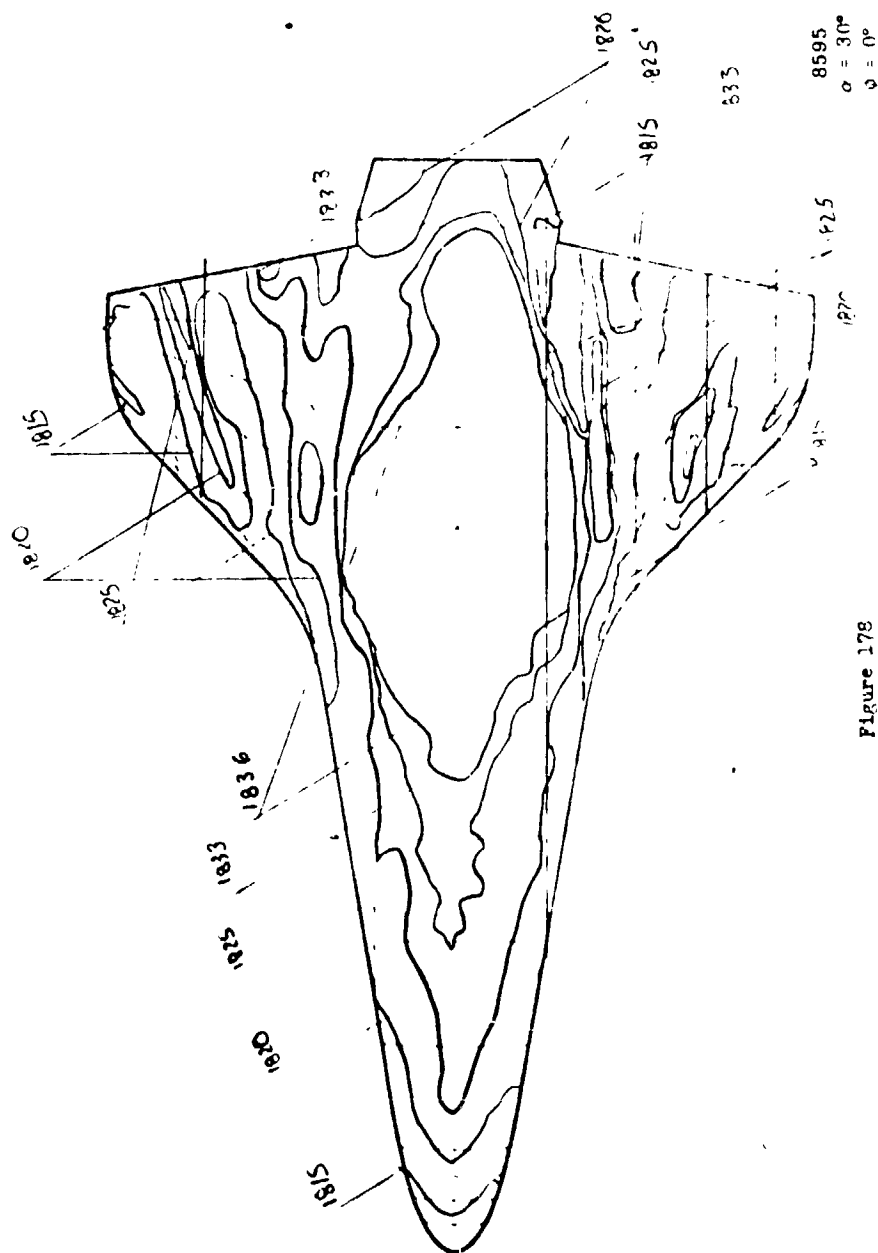


Figure 178

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 7/11/73

NASA-R1 ORBITER PEATING  
 AEDC(ARO-INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH PIPESONIC TUNNEL W

VA289

GROUP	CONFIG	MODEL	MACH NO	ON(PSTA)	TO(DEG R)	ALPHA-MODEL	ALPHA-SECTOR	ALPHA-PREBEND	ROLL-MODEL	YAW
132	2	ORBITER S	7.99	491.4	1324	30.00	.00	-30.00	-180.00	-0.00
T-INF P-INF Q-INF RHO-INF MU-INF RE/FT MREF SREF (DEG R) (PSTA) (PSIA) (FI/SEC) (SLUGS/FI3) (LB-SEC/FI2) (EI-1) (R= .0175EI) (R= .0175EI) 96.2 .031 2.268 3840 4.427E-05 7.748E-02 2.195E 06 3.710E-02 2.745E-02										
CAMERA	ROLL NO	PAINT (FMP (DEG F)	INITIAL TEMP (DEG F)	SQUARE ROOT (RHO/CK)	TBAR(TO)	BETA(TO)				
TOP(T)	7484		78	.0535	0	0				
SIG(FI3)	8537	250								
MOITCHIR	7938									

PIC NO	TYPE	DELTIME	H(TO)	HREF	H(-910)/HREF	M(-912TO)	H(-912TO)/HREF	ST(TO)
T 1812(250)	1.15		MODEL HAS NOT REACHED CENTERLINE					
S 5642(250)	1.15		MODEL HAS NOT REACHED CENTERLINE					
M 7744(250)	1.18		MODEL HAS NOT REACHED CENTERLINE					
M 7745(250)	2.25		MODEL HAS NOT REACHED CENTERLINE					
T 1813(250)	2.28		MODEL HAS NOT REACHED CENTERLINE					
S 5643(250)	2.28		MODEL HAS NOT REACHED CENTERLINE					
INJECT TIME = 2.34								
T 1814(250)	3.25		DATA NOT YET VALID					
M 7746(250)	3.25		DATA NOT YET VALID					
T 1815(250)	4.46	3.12	7.134E-03	.1925	8.990E-03	.2424	8.709E-03	.2348
S 5644(250)	4.46	3.12	7.138E-03	.1925	8.990E-03	.2424	8.709E-03	.2348
M 7747(250)	4.46	3.12	7.138E-03	.1925	8.990E-03	.2424	8.709E-03	.2348
T 1816(250)	5.53	4.24	6.155E-03	.1659	7.752E-03	.2090	7.510E-03	.2025
M 7748(250)	5.53	4.24	6.155E-03	.1659	7.752E-03	.2090	7.510E-03	.2025
S 5645(250)	5.56	4.22	6.166E-03	.1655	7.754E-03	.2084	7.489E-03	.2019
T 1817(250)	6.63	5.30	5.474E-03	.1477	6.894E-03	.1861	6.684E-03	.1803
S 5646(250)	6.63	5.30	5.474E-03	.1477	6.894E-03	.1861	6.684E-03	.1803
M 7749(250)	6.63	5.30	5.474E-03	.1477	6.894E-03	.1861	6.684E-03	.1803
T 1818(250)	7.71	6.37	4.944E-03	.1344	6.298E-03	.1606	6.094E-03	.1643
S 5647(250)	7.71	6.37	4.944E-03	.1344	6.298E-03	.1606	6.094E-03	.1643
M 7750(250)	7.71	6.37	4.944E-03	.1344	6.298E-03	.1606	6.094E-03	.1643
T 1819(250)	8.81	7.48	4.944E-03	.1344	6.298E-03	.1606	6.094E-03	.1643
S 5648(250)	8.81	7.48	4.944E-03	.1344	6.298E-03	.1606	6.094E-03	.1643
M 7751(250)	8.81	7.48	4.944E-03	.1344	6.298E-03	.1606	6.094E-03	.1643
T 1820(250)	9.91	8.58	4.305E-03	.1161	5.423E-03	.1463	5.253E-03	.1417
S 5649(250)	9.91	8.58	4.305E-03	.1161	5.423E-03	.1463	5.253E-03	.1417
M 7752(250)	9.91	8.58	4.305E-03	.1161	5.423E-03	.1463	5.253E-03	.1417

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7/11/73

NASA-HI ORBITER HEATING

AEOLIAN INC.) ARNOLD JFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL R

VA209

GROUP CONFIG MODEL MACH NO P(PSIA) T(DEG R) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREBEND ROLL-MODEL YAW  
 132 2 0.00 7.99 490.7 123 30.00 .00 -30.00 -180.00 -0.00

T-INF Q-INF U-INF V-INF MU-INF MU-INF DF/FT MREF STREF  
 (DEG R) (PSIA) (PSIA) (FT/SEC) (SLUGS/FT<sup>3</sup>) (LBS-SEC/FT<sup>2</sup>) (FT-1) (R= .0175FT) (R= .0175FT)  
 94.1 .051 2.264 30.3 4.423E-05 7.736E-04 2.194E 06 3.707E-02 2.746E-02

CAMERA MOLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHUXCKX) TRAN(10) BETA(10)  
 TOP(T) 7494 78 .0535 2.189E-01 2.3566E-01  
 SILE(5) 8537  
 BOTTOM(B) 7438

501

PIC NO	TIME DELTIME	M(IJ)	M(TO)/MREF	M(I,TO)/MREF	M(I,TO)/MREF	M(I,TO)/MREF	ST(10)
1 1-21(1250)	11.01	9.69	4.053E-03	.1093	5.105E-03	.1377	2.955E-03
2 5-51(1250)	11.01	9.69	4.053E-03	.1093	5.105E-03	.1377	2.955E-03
3 7753(1250)	11.01	9.69	4.053E-03	.1093	5.105E-03	.1377	2.955E-03
4 1427(1250)	12.11	10.70	3.840E-03	.1034	4.837E-03	.1305	2.801E-03
5 4457(1250)	12.11	10.70	3.840E-03	.1034	4.837E-03	.1305	2.801E-03
6 7754(1250)	12.11	10.70	3.840E-03	.1034	4.837E-03	.1305	2.801E-03
7 7754(1250)	13.19	11.84	3.642E-03	.0947	4.612E-03	.1243	2.667E-03
8 1423(1250)	13.22	11.80	3.650E-03	.0944	4.607E-03	.1242	2.665E-03
9 6453(1250)	13.22	11.80	3.650E-03	.0944	4.607E-03	.1242	2.665E-03
10 1424(1250)	14.29	12.04	3.513E-03	.0945	4.412E-03	.1190	2.553E-03
11 7754(1250)	14.29	12.04	3.513E-03	.0945	4.412E-03	.1190	2.553E-03
12 5454(1250)	14.32	12.02	3.444E-03	.0944	4.404E-03	.1149	2.551E-03
13 1-27(1250)	15.24	14.04	3.363E-03	.0907	4.231E-03	.1142	2.452E-03
14 5454(1250)	15.29	14.04	3.363E-03	.0907	4.231E-03	.1142	2.452E-03
15 7757(1250)	15.29	14.04	3.363E-03	.0907	4.231E-03	.1142	2.452E-03
16 1424(1250)	16.49	15.14	3.214E-03	.0873	4.074E-03	.1100	2.360E-03
17 6454(1250)	16.49	15.14	3.214E-03	.0873	4.074E-03	.1100	2.360E-03
18 7754(1250)	16.49	15.14	3.214E-03	.0873	4.074E-03	.1100	2.360E-03
19 5457(1250)	17.57	16.24	3.114E-03	.0843	3.941E-03	.1042	2.279E-03
20 1427(1250)	17.60	16.24	3.117E-03	.0843	3.934E-03	.1042	2.278E-03
21 7754(1250)	17.60	16.24	3.117E-03	.0843	3.934E-03	.1042	2.278E-03
22 1427(1250)	18.67	17.34	3.024E-03	.0814	3.814E-03	.1028	2.206E-03
23 7754(1250)	18.67	17.34	3.024E-03	.0814	3.814E-03	.1028	2.206E-03
24 5454(1250)	19.77	18.44	2.914E-03	.0792	3.694E-03	.0997	2.139E-03
25 5454(1250)	19.77	18.44	2.914E-03	.0792	3.694E-03	.0997	2.139E-03
26 7754(1250)	19.77	18.44	2.914E-03	.0792	3.694E-03	.0997	2.139E-03

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7/11/73

AEDC(ARO, INC.) ARNOLD AFB, TENNESSEE  
VON KARMAN GAS DYNAMICS FACILITY  
50 INCH HYPERSONIC TUNNEL A

**NASA-RI ORBITER LEAVING**

64244

GROUP	CONFID	MODEL	WALCH NO	DOIPSTIA	T0(DEG P)	ALPHA-MODEL	ALPHA-SECTION	ALPHA-PREPEND	ROLL-MODEL	YAW
13	2	ORBITER S	7.99	491.2	1323	30.00	.00	-30.00	-180.00	-0.00
T-TAF	P-TNF	Q-TNF	W-TNF	RMC-INF	MU-INF	HP/FT	MREF	STREF		
(DEG M)	(PSIA)	(PSIA)	(FT/SEC)	(SLUGS/FT <sup>2</sup> )	(LB-SEC/FT <sup>2</sup> )	(FT-LB)	(R=)	(M=)		
90.1	.051	2.257	3834	6.659E-05	7.737E-04	2.197E 04	3.709E-02	2.744E-02		

ROLL #	PAINT TEMP (DEG F)	INITIAL TEMP (DEG F)	SQUARE FOOT (RHOXCAK)	TRANS (TO)	BETA (TO)
7484					
8537	250	79	.0535	2.189E-01	2.3566E-01
8538					
8539					

PIC NO	TIME	DELTIME	W(TOT)	M(TOT)/HREF	W(9T0)	M(9T0)/HREF	M(.912T0)/HREF	M(.912T0)/M(TOT)	ST(TOT)
1	1762(250)	20.05	2.854E-03	.770	3.593E-03	.969	.939	2.080E-03	
1	1763(250)	20.07	2.852E-03	.769	3.593E-03	.969	.938	2.078E-03	
1	1764(250)	20.07	2.852E-03	.769	3.593E-03	.969	.938	2.078E-03	
1	1765(250)	21.05	2.777E-03	.749	3.494E-03	.943	.914	2.024E-03	
1	1766(250)	21.05	2.777E-03	.749	3.494E-03	.943	.914	2.024E-03	
1	1767(250)	21.05	2.777E-03	.749	3.494E-03	.943	.914	2.024E-03	
1	1768(250)	21.03	2.777E-03	.739	3.494E-03	.943	.914	2.024E-03	
1	1769(250)	21.03	2.777E-03	.739	3.494E-03	.943	.914	2.024E-03	
1	1770(250)	21.03	2.777E-03	.739	3.494E-03	.943	.914	2.024E-03	
1	1771(250)	21.03	2.777E-03	.739	3.494E-03	.943	.914	2.024E-03	
1	1772(250)	21.03	2.777E-03	.739	3.494E-03	.943	.914	2.024E-03	
1	1773(250)	21.03	2.777E-03	.739	3.494E-03	.943	.914	2.024E-03	
1	1774(250)	21.03	2.777E-03	.739	3.494E-03	.943	.914	2.024E-03	
1	1775(250)	21.03	2.777E-03	.739	3.494E-03	.943	.914	2.024E-03	
1	1776(250)	21.03	2.777E-03	.739	3.494E-03	.943	.914	2.024E-03	
1	1777(250)	21.03	2.777E-03	.739	3.494E-03	.943	.914	2.024E-03	
1	1778(250)	21.03	2.777E-03	.739	3.494E-03	.943	.914	2.024E-03	
1	1779(250)	21.03	2.777E-03	.739	3.494E-03	.943	.914	2.024E-03	
1	1780(250)	21.03	2.777E-03	.739	3.494E-03	.943	.914	2.024E-03	
1	1781(250)	21.03	2.777E-03	.739	3.494E-03	.943	.914	2.024E-03	
1	1782(250)	21.03	2.777E-03	.739	3.494E-03	.943	.914	2.024E-03	
1	1783(250)	21.03	2.777E-03	.739	3.494E-03	.943	.914	2.024E-03	
1	1784(250)	21.03	2.777E-03	.739	3.494E-03	.943	.914	2.024E-03	
1	1785(250)	21.03	2.777E-03	.739	3.494E-03	.943	.914	2.024E-03	
1	1786(250)	21.03	2.777E-03	.739	3.494E-03	.943	.914	2.024E-03	
1	1787(250)	21.03	2.777E-03	.739	3.494E-03	.943	.914	2.024E-03	
1	1788(250)	21.03	2.777E-03	.739	3.494E-03	.943	.914	2.024E-03	
1	1789(250)	21.03	2.777E-03	.739	3.494E-03	.943	.914	2.024E-03	
1	1790(250)	21.03	2.777E-03	.739	3.494E-03	.943	.914	2.024E-03	
1	1791(250)	21.03	2.777E-03	.739	3.494E-03	.943	.914	2.024E-03	
1	1792(250)	21.03	2.777E-03	.739	3.494E-03	.943	.914	2.024E-03	
1	1793(250)	21.03	2.777E-03	.739	3.494E-03	.943	.914	2.024E-03	
1	1794(250)	21.03	2.777E-03	.739	3.494E-03	.943	.914	2.024E-03	
1	1795(250)	21.03	2.777E-03	.739	3.494E-03	.943	.914	2.024E-03	
1	1796(250)	21.03	2.777E-03	.739	3.494E-03	.943	.914	2.024E-03	
1	1797(250)	21.03	2.777E-03	.739	3.494E-03	.943	.914	2.024E-03	
1	1798(250)	21.03	2.777E-03	.739	3.494E-03	.943	.914	2.024E-03	
1	1799(250)	21.03	2.777E-03	.739	3.494E-03	.943	.914	2.024E-03	
1	1800(250)	21.03	2.777E-03	.739	3.494E-03	.943	.914	2.024E-03	
1	1801(250)	21.03	2.777E-03	.739	3.494E-03	.943	.		



REPRODUCIBILITY OF THE ORIGINAL PAGE IS POOR.

Group 13  
8537  
ms

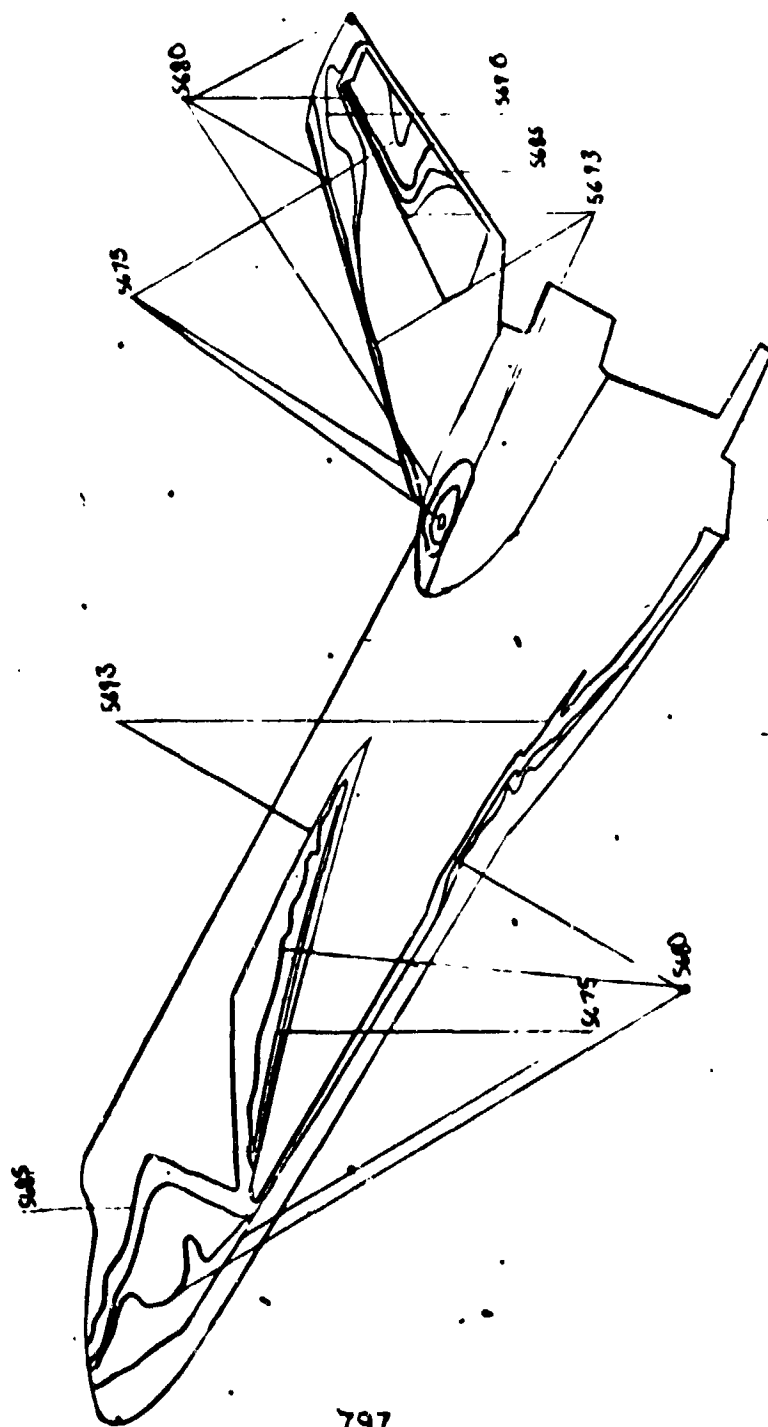
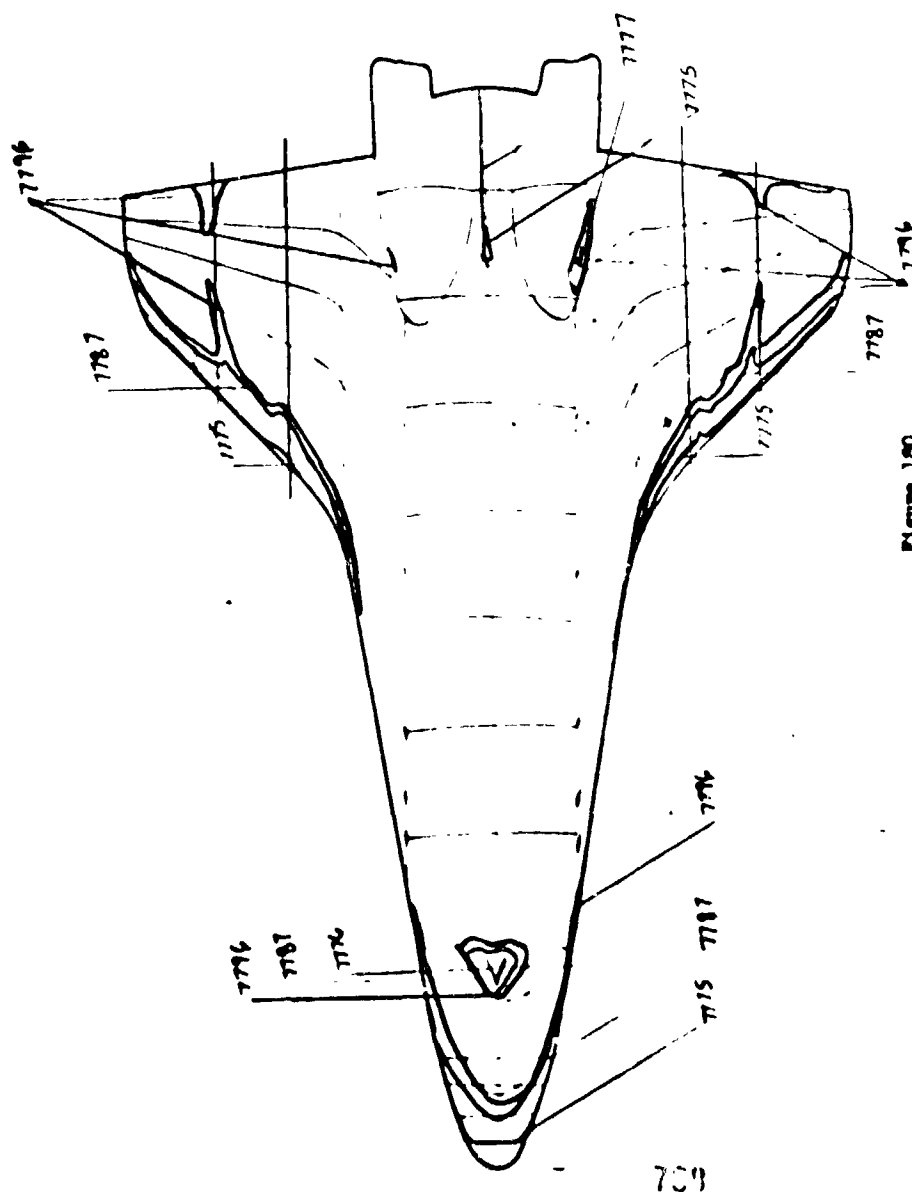


Figure 179

REPRODUCIBILITY OF THE ORIGINAL PAGE IS POOR.

Comp 133  
7998  
100

4528  
 $\alpha = 30^\circ$   
 $\phi = 0^\circ$



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7/11/73

MASA-RI ORBITER HEATING

AECI(ARO-INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL R

VA209

GROUP CONFIG MODEL MACH NO POI(PSIA) TOI(EG R) ALPHA-MODEL ALPHA-SECTION ALPHA-PREBEND ROLL-MODEL YAW  
 133 3 CAPTIVE S 7.99 689.6 1257 30.04 -.04 -30.00 -180.00 -.00  
 T-10F 0-1MF 0-1MF MU-1MF RE/FT MREF STREF  
 (DEG R) (PSIA) (FT/SEC) (SLUGS/FT) (LB-SEC/FT) (FT-1) (RM -.0175FT) (RM -.0175FT)  
 94.2 .050 2.255 3000 4.493E-05 7.580E-08 2.251E 04 3.606E-02 2.710E-02  
 CASE 4 ROLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RM01CAK) TRARITOI BETAITOI  
 104(1) 7484 77  
 510(1) 6537  
 MOTIC- BI 7538 .04P6 0 0

PIC NO TIME DELTIME M(TOI) M(TOI)/MREF M(.91TO) M(.91TO)/MREF ST(TOI)  
 1 1041(131) 1-15 MODEL WAS NOT REACHED CENTERLINE M(TOI)/MREF M(.91TO) M(.91TO)/MREF ST(TOI)  
 2 1041(131) 1-15 MODEL WAS NOT REACHED CENTERLINE  
 3 1041(131) 1-15 MODEL WAS NOT REACHED CENTERLINE  
 4 1041(131) 2-23 MODEL WAS NOT REACHED CENTERLINE  
 5 1041(131) 2-25 MODEL WAS NOT REACHED CENTERLINE  
 6 1041(131) 2-25 MODEL WAS NOT REACHED CENTERLINE  
 7 1041(131) 2-38  
 8 1041(131) 3-23 DATA NOT YET VALID  
 9 1041(131) 3-23 DATA NOT YET VALID  
 10 1041(131) 3-23 DATA NOT YET VALID  
 11 1041(131) 4-41 3-07 2-25RE-01 .0612 2-107E-03 .0596 1-350E-03  
 12 1041(131) 4-43 3-14 2-249E-01 .0610 2-108E-03 .0593 1-345E-03  
 13 1041(131) 4-43 3-10 2-249E-01 .0610 2-108E-03 .0593 1-345E-03  
 14 1041(131) 5-51 6-17 1-977E-01 .0525 1-885E-03 .0511 1-159E-03  
 15 1041(131) 5-51 6-17 1-977E-01 .0525 1-885E-03 .0511 1-159E-03  
 16 1041(131) 5-51 6-24 1-977E-01 .0525 1-885E-03 .0511 1-159E-03  
 17 1041(131) 5-51 6-27 1-977E-01 .0525 1-885E-03 .0511 1-159E-03  
 18 1041(131) 5-51 6-27 1-977E-01 .0525 1-885E-03 .0511 1-159E-03  
 19 1041(131) 5-51 6-27 1-977E-01 .0525 1-885E-03 .0511 1-159E-03  
 20 1041(131) 5-51 6-27 1-977E-01 .0525 1-885E-03 .0511 1-159E-03  
 21 1041(131) 5-51 6-27 1-977E-01 .0525 1-885E-03 .0511 1-159E-03  
 22 1041(131) 5-51 6-27 1-977E-01 .0525 1-885E-03 .0511 1-159E-03  
 23 1041(131) 5-51 6-27 1-977E-01 .0525 1-885E-03 .0511 1-159E-03  
 24 1041(131) 5-51 6-27 1-977E-01 .0525 1-885E-03 .0511 1-159E-03  
 25 1041(131) 5-51 6-27 1-977E-01 .0525 1-885E-03 .0511 1-159E-03  
 26 1041(131) 5-51 6-27 1-977E-01 .0525 1-885E-03 .0511 1-159E-03  
 27 1041(131) 5-51 6-27 1-977E-01 .0525 1-885E-03 .0511 1-159E-03  
 28 1041(131) 5-51 6-27 1-977E-01 .0525 1-885E-03 .0511 1-159E-03  
 29 1041(131) 5-51 6-27 1-977E-01 .0525 1-885E-03 .0511 1-159E-03  
 30 1041(131) 5-51 6-27 1-977E-01 .0525 1-885E-03 .0511 1-159E-03  
 31 1041(131) 5-51 6-27 1-977E-01 .0525 1-885E-03 .0511 1-159E-03  
 32 1041(131) 5-51 6-27 1-977E-01 .0525 1-885E-03 .0511 1-159E-03  
 33 1041(131) 5-51 6-27 1-977E-01 .0525 1-885E-03 .0511 1-159E-03  
 34 1041(131) 5-51 6-27 1-977E-01 .0525 1-885E-03 .0511 1-159E-03  
 35 1041(131) 5-51 6-27 1-977E-01 .0525 1-885E-03 .0511 1-159E-03  
 36 1041(131) 5-51 6-27 1-977E-01 .0525 1-885E-03 .0511 1-159E-03  
 37 1041(131) 5-51 6-27 1-977E-01 .0525 1-885E-03 .0511 1-159E-03  
 38 1041(131) 5-51 6-27 1-977E-01 .0525 1-885E-03 .0511 1-159E-03  
 39 1041(131) 5-51 6-27 1-977E-01 .0525 1-885E-03 .0511 1-159E-03  
 40 1041(131) 5-51 6-27 1-977E-01 .0525 1-885E-03 .0511 1-159E-03  
 41 1041(131) 5-51 6-27 1-977E-01 .0525 1-885E-03 .0511 1-159E-03  
 42 1041(131) 5-51 6-27 1-977E-01 .0525 1-885E-03 .0511 1-159E-03  
 43 1041(131) 5-51 6-27 1-977E-01 .0525 1-885E-03 .0511 1-159E-03  
 44 1041(131) 5-51 6-27 1-977E-01 .0525 1-885E-03 .0511 1-159E-03  
 45 1041(131) 5-51 6-27 1-977E-01 .0525 1-885E-03 .0511 1-159E-03  
 46 1041(131) 5-51 6-27 1-977E-01 .0525 1-885E-03 .0511 1-159E-03  
 47 1041(131) 5-51 6-27 1-977E-01 .0525 1-885E-03 .0511 1-159E-03  
 48 1041(131) 5-51 6-27 1-977E-01 .0525 1-885E-03 .0511 1-159E-03  
 49 1041(131) 5-51 6-27 1-977E-01 .0525 1-885E-03 .0511 1-159E-03  
 50 1041(131) 5-51 6-27 1-977E-01 .0525 1-885E-03 .0511 1-159E-03  
 51 1041(131) 5-51 6-27 1-977E-01 .0525 1-885E-03 .0511 1-159E-03  
 52 1041(131) 5-51 6-27 1-977E-01 .0525 1-885E-03 .0511 1-159E-03  
 53 1041(131) 5-51 6-27 1-977E-01 .0525 1-885E-03 .0511 1-159E-03  
 54 1041(131) 5-51 6-27 1-977E-01 .0525 1-885E-03 .0511 1-159E-03  
 55 1041(131) 5-51 6-27 1-977E-01 .0525 1-885E-03 .0511 1-159E-03  
 56 1041(131) 5-51 6-27 1-977E-01 .0525 1-885E-03 .0511 1-159E-03  
 57 1041(131) 5-51 6-27 1-977E-01 .0525 1-885E-03 .0511 1-159E-03  
 58 1041(131) 5-51 6-27 1-977E-01 .0525 1-885E-03 .0511 1-159E-03  
 59 1041(131) 5-51 6-27 1-977E-01 .0525 1-885E-03 .0511 1-159E-03  
 60 1041(131) 5-51 6-27 1-977E-01 .0525 1-885E-03 .0511 1-159E-03  
 61 1041(131) 5-51 6-27 1-977E-01 .0525 1-885E-03 .0511 1-159E-03  
 62 1041(131) 5-51 6-27 1-977E-01 .0525 1-885E-03 .0511 1-159E-03  
 63 1041(131) 5-51 6-27 1-977E-01 .0525 1-885E-03 .0511 1-159E-03  
 64 1041(131) 5-51 6-27 1-977E-01 .0525 1-885E-03 .0511 1-159E-03  
 65 1041(131) 5-51 6-27 1-977E-01 .0525 1-885E-03 .0511 1-159E-03  
 66 1041(131) 5-51 6-27 1-977E-01 .0525 1-885E-03 .0511 1-159E-03  
 67 1041(131) 5-51 6-27 1-977E-01 .0525 1-885E-03 .0511 1-159E-03  
 68 1041(131) 5-51 6-27 1-977E-01 .0525 1-885E-03 .0511 1-159E-03  
 69 1041(131) 5-51 6-27 1-977E-01 .0525 1-885E-03 .0511 1-159E-03  
 70 1041(131) 5-51 6-27 1-977E-01 .0525 1-885E-03 .0511 1-159E-03  
 71 1041(131) 5-51 6-27 1-977E-01 .0525 1-885E-03 .0511 1-159E-03  
 72 1041(131) 5-51 6-27 1-977E-01 .0525 1-885E-03 .0511 1-159E-03  
 73 1041(131) 5-51 6-27 1-977E-01 .0525 1-885E-03 .0511 1-159E-03  
 74 1041(131) 5-51 6-27 1-977E-01 .0525 1-885E-03 .0511 1-159E-03  
 75 1041(131) 5-51 6-27 1-977E-01 .0525 1-885E-03 .0511 1-159E-03  
 76 1041(131) 5-51 6-27 1-977E-01 .0525 1-885E-03 .0511 1-159E-03  
 77 1041(131) 5-51 6-27 1-977E-01 .0525 1-885E-03 .0511 1-159E-03  
 78 1041(131) 5-51 6-27 1-977E-01 .0525 1-885E-03 .0511 1-159E-03  
 79 1041(131) 5-51 6-27 1-977E-01 .0525 1-885E-03 .0511 1-159E-03  
 80 1041(131) 5-51 6-27 1-977E-01 .0525 1-885E-03 .0511 1-159E-03  
 81 1041(131) 5-51 6-27 1-977E-01 .0525 1-885E-03 .0511 1-159E-03  
 82 1041(131) 5-51 6-27 1-977E-01 .0525 1-885E-03 .0511 1-159E-03  
 83 1041(131) 5-51 6-27 1-977E-01 .0525 1-885E-03 .0511 1-159E-03  
 84 1041(131) 5-51 6-27 1-977E-01 .0525 1-885E-03 .0511 1-159E-03  
 85 1041(131) 5-51 6-27 1-977E-01 .0525 1-885E-03 .0511 1-159E-03  
 86 1041(131) 5-51 6-27 1-977E-01 .0525 1-885E-03 .0511 1-159E-03  
 87 1041(131) 5-51 6-27 1-977E-01 .0525 1-885E-03 .0511 1-159E-03  
 88 1041(131) 5-51 6-27 1-977E-01 .0525 1-885E-03 .0511 1-159E-03  
 89 1041(131) 5-51 6-27 1-977E-01 .0525 1-885E-03 .0511 1-159E-03  
 90 1041(131) 5-51 6-27 1-977E-01 .0525 1-885E-03 .0511 1-159E-03  
 91 1041(131) 5-51 6-27 1-977E-01 .0525 1-885E-03 .0511 1-159E-03  
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 93 1041(131) 5-51 6-27 1-977E-01 .0525 1-885E-03 .0511 1-159E-03  
 94 1041(131) 5-51 6-27 1-977E-01 .0525 1-885E-03 .0511 1-159E-03  
 95 1041(131) 5-51 6-27 1-977E-01 .0525 1-885E-03 .0511 1-159E-03  
 96 1041(131) 5-51 6-27 1-977E-01 .0525 1-885E-03 .0511 1-159E-03  
 97 1041(131) 5-51 6-27 1-977E-01 .0525 1-885E-03 .0511 1-159E-03  
 98 1041(131) 5-51 6-27 1-977E-01 .0525 1-885E-03 .0511 1-159E-03  
 99 1041(131) 5-51 6-27 1-977E-01 .0525 1-885E-03 .0511 1-159E-03  
 100 1041(131) 5-51 6-27 1-977E-01 .0525 1-885E-03 .0511 1-159E-03

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7/11/73

AEDC(ARO-INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL A

MASA-R: ORBITER HEATING

VAPR9

GROUP CONFIG MODEL MACH NO PO(PSIA) TO( DEG R) ALPHA-MODEL ALPHA-SECTION ALPHA-PREBEND ROLL-MODEL YAW  
 133 2 ORBITER S 7.99 489.6 1294 30.04 -0.04 -30.00 -180.00 -0.00

T-INF P-INF O-INF V-INF MU-INF MU-INF RF/FT MREF SINEF  
 (DEG R) (PSIA) (PSIA) (PSIA) (SLUGS/FT3) (LR-SEC/FT2) (FT-1) (IN-0175FI) (IN-0175FI)

94.2 .051 2.259 3802 4.499E-05 7.591E-09 2.253E 06 3.491E-02 2.717E-02

CAMERA ROLL NO PAINT IF4P (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHOXCK) TRAR(TO) BETA(TO)

TOP(T) 7484 131 77 0.046 7.100E-02 6.6690E-02

MOTICMUB

PIC NO	TIME DELTIME	M(I/O)	M(I/O)/MREF	M(I-9TO)/MREF	M(I-913TO)/MREF	ST(TO)
S 5488(131)	19.70	7.564E-04	.0205	.0250	8.985E-04	5.521E-04
T 1454(131)	20.77	7.351E-04	.0199	.0243	8.733E-04	5.367E-04
S 5449(131)	20.77	7.351E-04	.0199	.0243	8.733E-04	5.367E-04
M 7741(131)	20.77	7.351E-04	.0199	.0243	8.733E-04	5.367E-04
M 7742(131)	21.85	7.151E-04	.0194	.0236	8.500E-04	5.221E-04
T 1463(131)	21.85	7.151E-04	.0194	.0236	8.495E-04	5.218E-04
S 5490(131)	21.85	7.151E-04	.0194	.0236	8.495E-04	5.218E-04
T 1461(131)	22.55	6.971E-04	.0189	.0231	8.281E-04	5.089E-04
S 5491(131)	22.55	6.971E-04	.0189	.0231	8.281E-04	5.089E-04
M 7743(131)	22.55	6.971E-04	.0189	.0231	8.281E-04	5.089E-04
S 5492(131)	24.45	6.741E-04	.0183	.0223	8.004E-04	4.918E-04
M 7744(131)	24.45	6.741E-04	.0183	.0223	8.004E-04	4.918E-04
T 1462(131)	24.45	6.741E-04	.0183	.0223	8.004E-04	4.918E-04
T 1463(131)	26.53	6.457E-04	.0175	.0213	7.670E-04	4.711E-04
S 5493(131)	26.53	6.457E-04	.0175	.0213	7.670E-04	4.711E-04
M 7745(131)	26.53	6.457E-04	.0175	.0213	7.670E-04	4.711E-04
T 1464(131)	27.74	6.203E-04	.0168	.0205	7.369E-04	4.527E-04
S 5494(131)	27.74	6.203E-04	.0168	.0205	7.369E-04	4.527E-04
M 7746(131)	27.74	6.203E-04	.0168	.0205	7.369E-04	4.527E-04
MODEL HAS LEFT CENTERLINE						
M 7747(131)	29.39	5.940E-04	.0162	.0198	7.104E-04	4.365E-04
T 1465(131)	30.74	5.940E-04	.0162	.0198	7.104E-04	4.365E-04
S 5495(131)	30.74	5.940E-04	.0162	.0198	7.104E-04	4.365E-04

Group 134  
7482  
WD

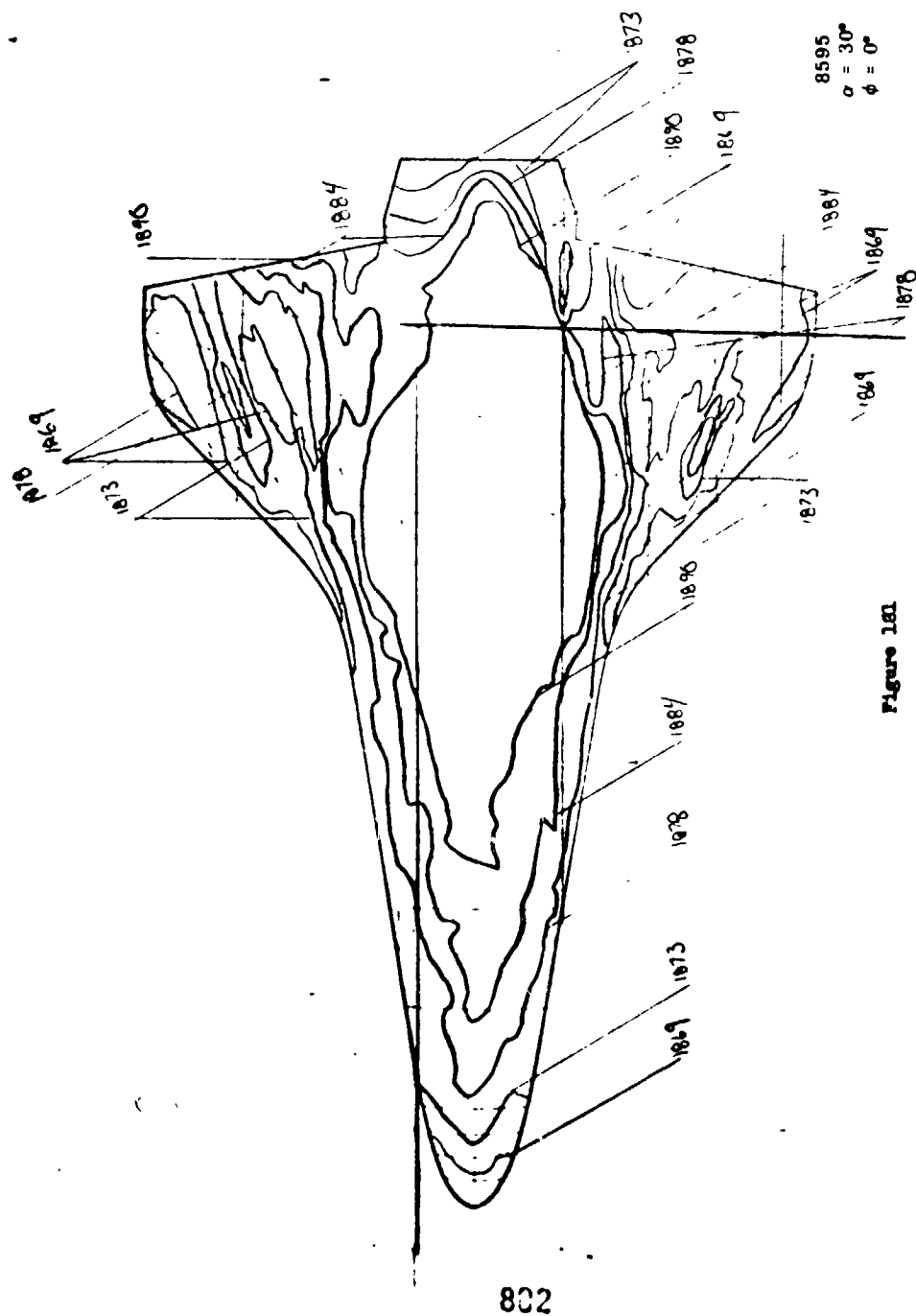


Figure 181





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 • UNCLASSIFIED •  
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7/11/73

NASA-JS ORBITER HEATING

WADAG

AEDC(APO-INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL A

GROUP CONFIG MODEL MACH NO PO(PSIA) TO(CEG P) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREBEND ROLL-MODEL YA.  
 134 4 CREITFM R1 7.99 490.8 1314 30.04 -0.04 -30.00 -180.00 -0.00  
 T-1-F P-1-F 2-1-F V-1-F RHO-INF MU-INF DE/FT HREF STREF  
 (DEG R) (PSIA) (PSIA) (LFI/SEC) (LUGS/FT) (FT-1) (R= .0175FT) (IN= .0175FT)  
 95.4 .051 2.255 3024 4.656E-05 7.682E-08 2.219E 04 3.703E-02 2.734E-02

CAMERA ROLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHO/CCK) TRAR(ITO) BETA(ITO)  
 TOP(T) 7484  
 STRE(SI) 8537  
 HOT(T) 7538  
 250 78 .0535 2.217E-01 2.3944E-01

JTC NO	TIME	DELTIME	H(ITO)	HREF	H(ITO)/HREF	H(-.9TO)/HREF	H(-.913TO)/HREF	ST(ITO)
T 1275(250)	11.01	9.64	4.121E-03	.1113	5.201E-03	.1404	5.034E-03	2.995E-03
S 5745(250)	11.01	9.64	4.121E-03	.1113	5.201E-03	.1404	5.034E-03	2.995E-03
M 7-37(250)	11.01	9.64	4.121E-03	.1113	5.201E-03	.1404	5.034E-03	2.995E-03
T 1074(250)	12.09	10.74	3.919E-03	.1055	4.934E-03	.1332	4.777E-03	2.840E-03
M 7000(250)	12.09	10.74	3.919E-03	.1055	4.934E-03	.1332	4.777E-03	2.840E-03
S 4724(250)	12.11	10.77	3.919E-03	.1054	4.934E-03	.1331	4.777E-03	2.838E-03
T 1077(250)	13.19	11.84	3.723E-03	.1005	4.659E-03	.1249	4.549E-03	2.706E-03
S 5727(250)	13.19	11.84	3.723E-03	.1005	4.659E-03	.1249	4.549E-03	2.706E-03
M 7205(250)	13.19	11.84	3.723E-03	.1005	4.659E-03	.1249	4.549E-03	2.706E-03
T 1077(250)	14.27	12.92	3.546E-03	.0962	4.439E-03	.1214	4.358E-03	2.590E-03
M 7-12(250)	14.27	12.92	3.546E-03	.0962	4.439E-03	.1214	4.358E-03	2.590E-03
S 5704(250)	14.27	12.94	3.546E-03	.0961	4.439E-03	.1213	4.358E-03	2.587E-03
M 7011(250)	15.33	13.99	3.421E-03	.0924	4.322E-03	.1147	4.185E-03	2.488E-03
T 1074(250)	15.37	14.02	3.421E-03	.0924	4.322E-03	.1146	4.185E-03	2.486E-03
S 5723(250)	15.37	14.02	3.421E-03	.0924	4.322E-03	.1146	4.185E-03	2.486E-03
T 1074(250)	16.44	15.09	3.217E-03	.0840	4.101E-03	.1123	4.024E-03	2.395E-03
S 5710(250)	16.44	15.09	3.217E-03	.0840	4.101E-03	.1123	4.024E-03	2.395E-03
M 7-12(250)	16.44	15.09	3.217E-03	.0840	4.101E-03	.1123	4.024E-03	2.395E-03
T 1074(250)	17.55	16.17	3.105E-03	.0859	4.071E-03	.1085	3.890E-03	2.315E-03
S 5711(250)	17.55	16.20	3.105E-03	.0859	4.071E-03	.1085	3.890E-03	2.314E-03
T 1074(250)	17.55	16.20	3.105E-03	.0859	4.071E-03	.1085	3.890E-03	2.314E-03
S 5712(250)	17.55	16.27	3.002E-03	.0832	3.940E-03	.1050	3.767E-03	2.239E-03
M 7-14(250)	17.55	16.27	3.002E-03	.0832	3.940E-03	.1050	3.767E-03	2.239E-03
T 1074(250)	18.70	18.35	2.911E-03	.0807	3.774E-03	.1019	3.654E-03	2.173E-03
S 5713(250)	18.70	18.35	2.911E-03	.0807	3.774E-03	.1019	3.654E-03	2.173E-03

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WASA-RI CRATER FEATING  
VAZRG

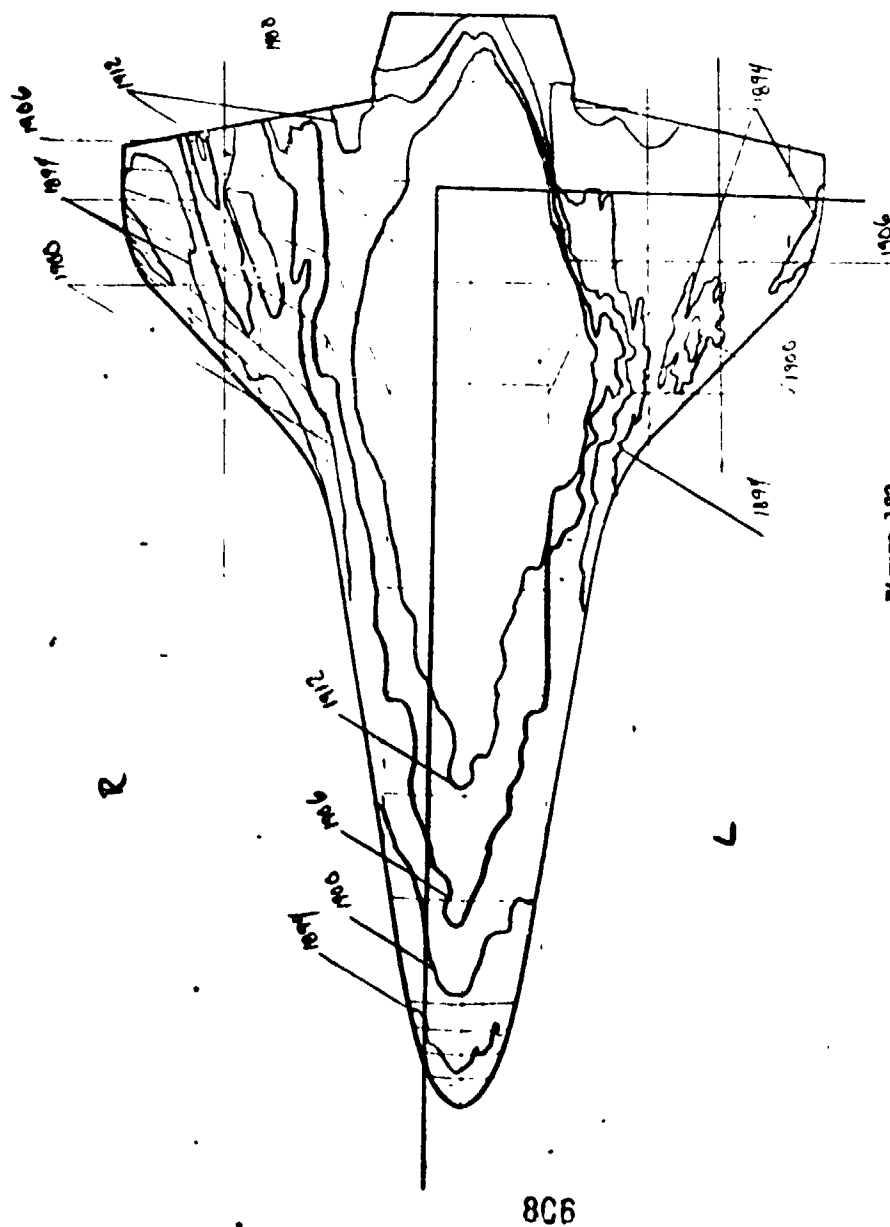
UNCLASSIFIED  
7/11/73

TIME	COMPTE	MODEL	MACH NO	PR(PSIA)	TO(DEG R)	ALPHA-MODEL	ALPHA-SECTOR	ALPHA-PREBEND	ROLL-MODEL	YAW
174	6	ORBITFM R1	7.99	491.1	1314	30.04	-0.04	-30.00	-180.00	-0.00

CAMERA	ROLL NO	PAINT TEMP (DGF F)	INITIAL TEMP (DEG F)	SQUARE ROOT (RHOXCKK)	T8AR(10)	BETA(T0)
TOP(T)	74R4					
R537		250	78	.0535	2.217E-01	2.3944E-01
SIDE(S)						
MOTIC(MR)	753R					

P/C NO	TIME	M(TO)	M(TO)/HREF	M(TO)	M(.913TO)/HREF	M(.913TO)	ST(10)
M	7615(250)	19.72	2.968E-03	.0907	3.772E-03	3.652E-03	2.172E-03
M	7616(250)	20.00	2.965E-03	.0794	3.661E-03	3.549E-03	2.110E-03
M	7618(250)	20.00	2.965E-03	.0784	3.666E-03	3.549E-03	2.110E-03
S	5714(250)	20.02	2.963E-03	.0784	3.664E-03	3.547E-03	2.109E-03
T	1045(250)	21.50	2.826E-03	.0753	3.567E-03	3.453E-03	2.132E-03
S	5715(250)	21.50	2.826E-03	.0763	3.567E-03	3.453E-03	2.132E-03
M	7617(250)	21.50	2.825E-03	.0763	3.567E-03	3.453E-03	2.132E-03
M	7618(250)	22.00	2.755E-03	.0744	3.477E-03	3.364E-03	1.995E-03
T	1046(250)	22.00	2.755E-03	.0744	3.477E-03	3.364E-03	1.995E-03
S	5716(250)	22.00	2.753E-03	.0743	3.475E-03	3.364E-03	1.995E-03
S	5717(250)	22.00	2.647E-03	.0725	3.391E-03	3.283E-03	1.951E-03
M	7619(250)	22.00	2.647E-03	.0725	3.391E-03	3.283E-03	1.951E-03
T	1047(250)	22.10	2.605E-03	.0704	3.332E-03	3.207E-03	1.905E-03
T	1048(250)	22.10	2.605E-03	.0704	3.332E-03	3.207E-03	1.905E-03
S	5714(250)	25.10	2.624E-03	.0709	3.312E-03	3.207E-03	1.905E-03
T	7620(250)	25.10	2.624E-03	.0709	3.312E-03	3.207E-03	1.905E-03
T	7621(250)	25.53	2.543E-03	.0689	3.222E-03	3.114E-03	1.854E-03
S	5714(250)	26.53	2.543E-03	.0689	3.222E-03	3.114E-03	1.854E-03
M	7622(250)	26.53	2.553E-03	.0689	3.222E-03	3.114E-03	1.854E-03
M	7623(250)	27.00	2.465E-03	.0662	3.095E-03	2.997E-03	1.780E-03
T	1049(250)	27.00	2.465E-03	.0662	3.095E-03	2.997E-03	1.780E-03
T	1050(250)	27.00	2.465E-03	.0662	3.095E-03	2.997E-03	1.780E-03

MODEL HAS LEFT CENTRALINE 24.23



8595  
 $\alpha = 30^\circ$   
 $\phi = 0^\circ$

Figure 182



7/11/73

WAS-41 ORRILEE HEATING

WA299

GROUP	CONFID	MODEL	WACH NO	PO(PSTIA)	TU(DEC R)	ALPHA-MODEL	ALPHA-SECTOR	ALPHA-PREBEND	ROLL-MODEL	YAW
175	C	CRETEFH R2	7.99	491.2	13.14	30.04	-.04	-30.00	-180.00	-.00

(PSIA)	(PSIA)	(FT/SEC)	(SLUGS/FT <sup>2</sup> )	(H-SEC/FT <sup>2</sup> )	(F+1)	(R= .0175FI) — (R= .0175FI)
.951	2.267	3838	4.447E-05	7.705E-08	2.210E 06	2.737E-02

WELL NO	PAINT TEMP (DEG F)	INITIAL TEMP (DEG F)	SQUARE ROOT (MM/SEC)	TRANSITO	RETA(ITO)
7484					
MS37	250	70	.0535	2.205E-01	2.3784E-01

PIC NO	TIME	M(TOT)	M(TOT)/MREF	M(-910)	M(-910)/MREF	M(-913TO) M(-913TO)/MREF	ST(ITO)
T 1902(1250)	10:59	9.66	1106	5.169E-03	1395	5.006E-03	2.983E-03
T 7032(1250)	10:59	9.66	1106	5.169E-03	1395	5.006E-03	2.983E-03
S 5732(1250)	11:01	9.66	1106	5.163E-03	1393	4.998E-03	2.976E-03
T 1521(1250)	12:09	11.74	1047	4.897E-03	1321	4.742E-03	2.822E-03
S 7331(1250)	12:09	11.74	1047	4.897E-03	1321	4.742E-03	2.822E-03
M 7432(1250)	12:09	11.74	1047	4.897E-03	1321	4.742E-03	2.822E-03
T 1902(1250)	13:19	11.84	1049	4.644E-03	1258	4.516E-03	2.688E-03
S 5732(1250)	13:19	11.84	1049	4.644E-03	1258	4.516E-03	2.688E-03
M 7432(1250)	13:19	11.84	1049	4.644E-03	1258	4.516E-03	2.688E-03
T 1521(1250)	14:27	12.92	1045	4.454E-03	1204	4.324E-03	2.572E-03
S 7331(1250)	14:27	12.92	1045	4.454E-03	1204	4.324E-03	2.572E-03
M 7432(1250)	14:29	12.94	1045	4.454E-03	1204	4.324E-03	2.572E-03
T 1521(1250)	15:34	13.96	1017	4.294E-03	1157	4.154E-03	2.472E-03
S 7331(1250)	15:37	14.00	1016	4.294E-03	1156	4.154E-03	2.469E-03
M 7432(1250)	15:37	14.02	1016	4.294E-03	1156	4.154E-03	2.469E-03
T 1521(1250)	16:44	15.09	1043	4.131E-03	1114	4.000E-03	2.381E-03
S 7331(1250)	16:44	15.09	1043	4.131E-03	1114	4.000E-03	2.381E-03
M 7432(1250)	16:45	15.20	1043	4.131E-03	1114	4.000E-03	2.381E-03
S 5732(1250)	17:55	16.20	1052	3.994E-03	1075	3.862E-03	2.297E-03
T 1521(1250)	17:55	16.20	1052	3.994E-03	1075	3.862E-03	2.297E-03
S 7331(1250)	17:57	17.27	1025	3.842E-03	1041	3.734E-03	2.224E-03
M 7432(1250)	17:57	17.27	1025	3.842E-03	1041	3.734E-03	2.224E-03
T 1521(1250)	18:02	17.27	1025	3.842E-03	1041	3.734E-03	2.224E-03
M 7432(1250)	18:02	17.27	1025	3.842E-03	1041	3.734E-03	2.224E-03
T 1521(1250)	19:10	19.13	1040	3.671E-03	1010	3.624E-03	2.157E-03

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 UNCLASSIFIED  
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7/11/73

NASA-81 ORBITER HEATING  
 VA209  
 AEDC(APO, INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL A

GROUP	CONFID	MODEL	MACH NO	PO(PST)	TO(CEG R)	ALPHA-MODEL	ALPHA-SECTOR	ALPHA-PREBEND	ROLL-MODEL	YAW
13c	5	ORBITER R2	7.99	492.0	1318	30.04	-0.04	-30.00	-100.00	-0.00
T-1AF	P-1AF	Q-1AF	V-1AF	RNO-1AF	WU-1AF	WE/FT	MREF	SIREF		
(DEG H)	(PSIA)	(FT/SEC)	(SLUGS/FT <sup>3</sup> )	(LH-SEC/FT <sup>3</sup> )	(FT-1)	(IN-0175FT)	(IN-0175FT)			
96.7	0.51	2.270	7830	4.453E-05	7.707E-08	2.213E 06	3.709E-02	2.735E-02		
CAMFRA	MOLL NO	PAINT IFMP (DEG F)	INITIAL TEMP (DEG F)	SQUARE ROOT (RHODACK)	TRAR(TO)	BETA(TO)				
TOP(T)	7484									
SIDE(S)	8537									
WOTCH(B)	7538									

PIC NO	TIME DELTIME	M(TO)	M(TO)/MREF	M(10)	M(10)/MREF	M(.913TO)	M(.913TO)/MREF	ST(10)
1 1904(250)	19.72	18.37	0.980	3.744E-03	1.009	3.624E-03	0.977	2.156E-03
2 5734(250)	19.72	18.37	0.980	3.744E-03	1.009	3.624E-03	0.977	2.156E-03
3 1503(250)	20.00	19.45	0.974	3.639E-03	0.981	3.524E-03	0.950	2.096E-03
4 7541(250)	20.00	19.45	0.974	3.639E-03	0.981	3.524E-03	0.950	2.096E-03
5 7541(250)	20.00	19.45	0.974	3.639E-03	0.981	3.524E-03	0.950	2.096E-03
6 7541(250)	20.00	19.45	0.974	3.639E-03	0.981	3.524E-03	0.950	2.096E-03
7 1510(250)	21.50	20.50	0.957	3.540E-03	0.954	3.424E-03	0.924	2.039E-03
8 5740(250)	21.50	20.50	0.957	3.540E-03	0.954	3.424E-03	0.924	2.039E-03
9 7542(250)	21.50	20.50	0.957	3.540E-03	0.954	3.424E-03	0.924	2.039E-03
10 1511(250)	22.50	21.50	0.939	3.451E-03	0.930	3.342E-03	0.901	1.987E-03
11 7543(250)	22.50	21.50	0.939	3.451E-03	0.930	3.342E-03	0.901	1.987E-03
12 5741(250)	23.00	21.50	0.937	3.449E-03	0.930	3.340E-03	0.900	1.986E-03
13 1512(250)	24.50	23.45	0.909	3.314E-03	0.893	3.209E-03	0.865	1.908E-03
14 5742(250)	24.50	23.45	0.909	3.314E-03	0.893	3.209E-03	0.865	1.908E-03
15 7544(250)	24.50	23.45	0.909	3.314E-03	0.893	3.209E-03	0.865	1.908E-03
MODEL HAS LEFT CENTERLINE								
16 1513(250)	26.00	25.50	0.879	3.176E-03	0.856	3.074E-03	0.829	1.829E-03
17 5743(250)	26.00	25.50	0.879	3.176E-03	0.856	3.074E-03	0.829	1.829E-03
18 7545(250)	26.00	25.50	0.879	3.176E-03	0.856	3.074E-03	0.829	1.829E-03

Group 136  
8537  
ms

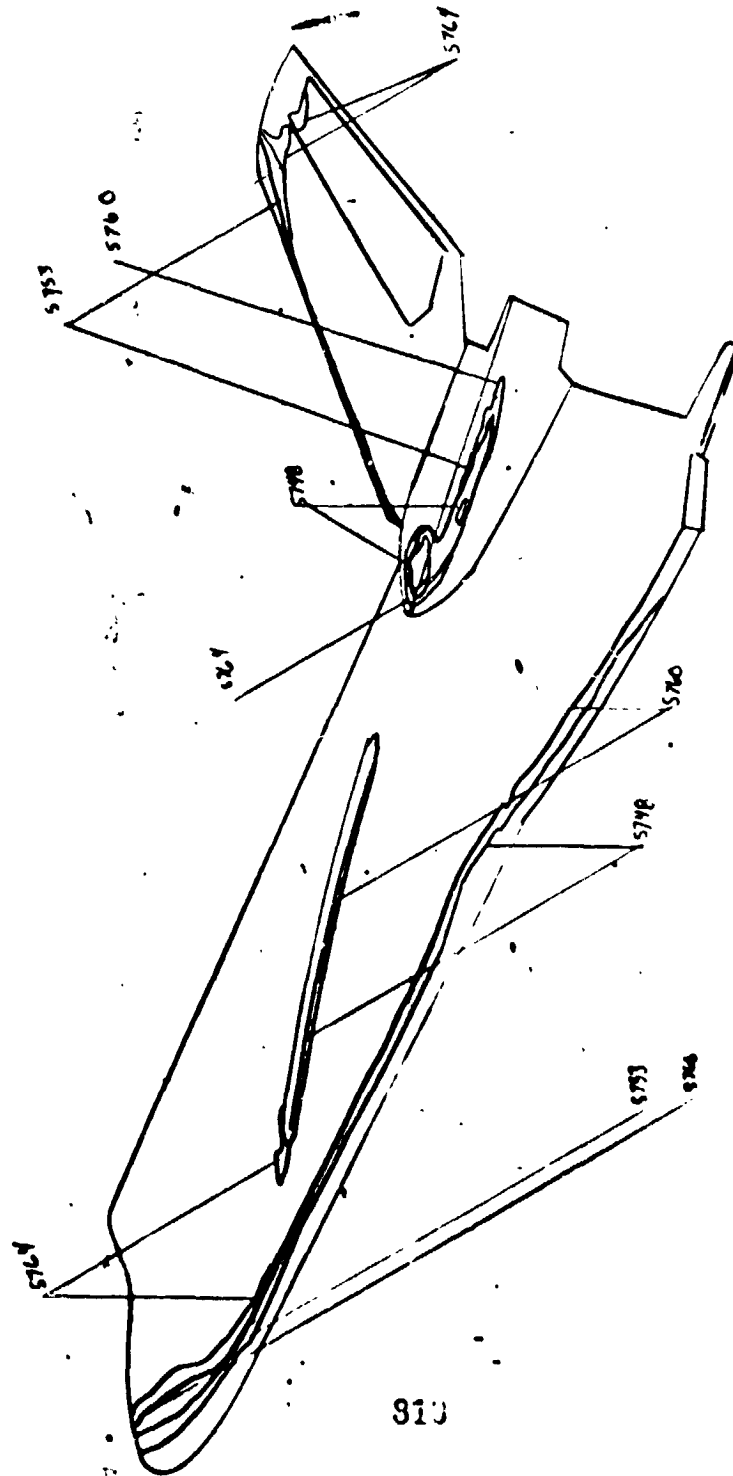
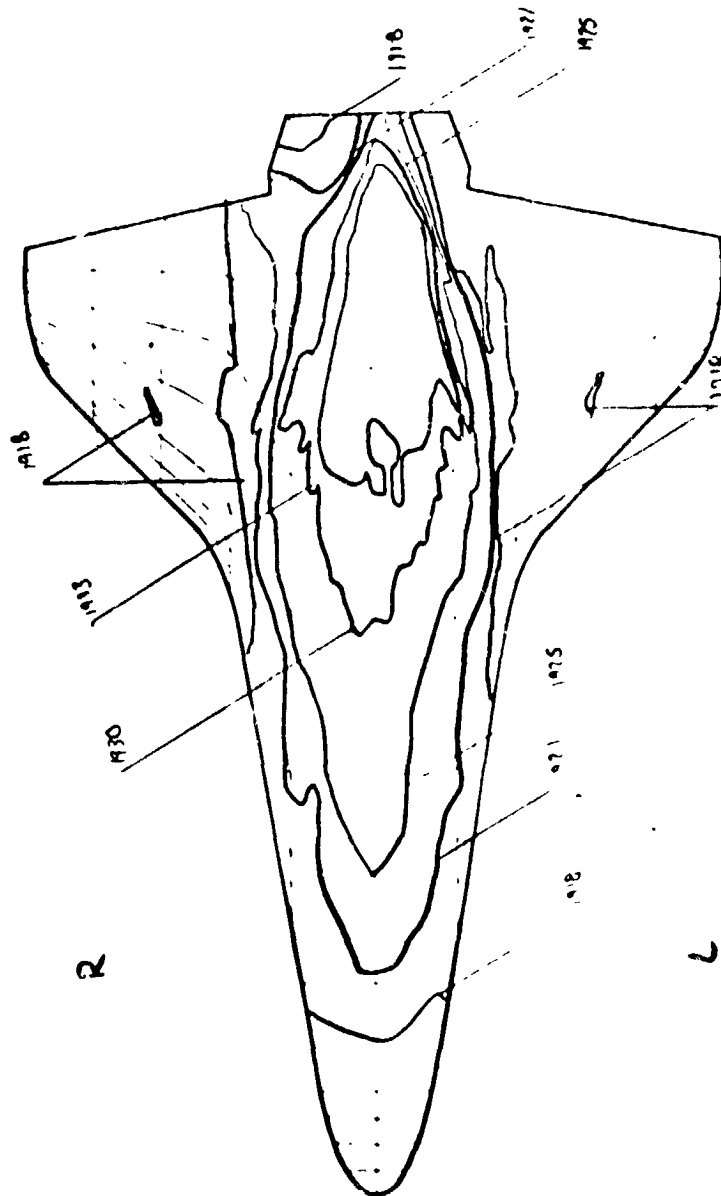


Figure 163

910



Group 136  
7482  
NO



8592  
 $\alpha = 25^\circ$   
 $\phi = 0^\circ$

Figure 184

Group 36  
7938  
nd

4525  
 $\alpha = 25^\circ$   
 $\phi = 0^\circ$

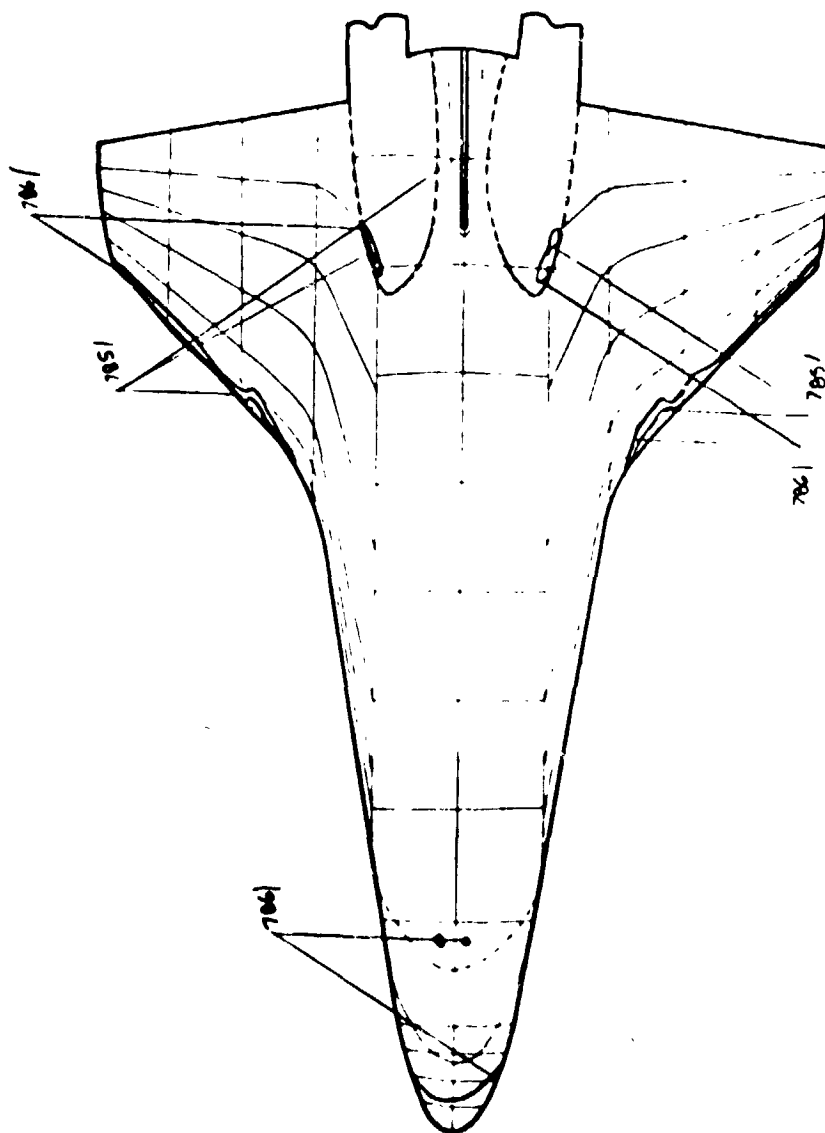


Figure 185

WAS-4-41 700725 1-2417-2

WAZOO

GROUP	CONF16	MODEL	MACH NO	PR(PST4)	TO(DEL R)	ALPHA-MODEL	ALPHA-SECTOR	ALPHA-PRE-ENO	ROLL-MODEL	YAW
114	2	ORBITF4 S	7.99	401.1	1321	24.03	4.97	-30.00	-180.00	-0.00

T-1af	Q-1NF	V-1NF	RW-1NF	WU-1NF	WE/FI	MREF	SIREF
(PSIA)	(PSIA)	(PSIA)	(SLUGS/FI)	(LB-SEC/FI)	(FI-1)	--(H= .0175FI)	--(H= .0175FI)
.062	2.774	3AJS	5.638F-D5	7.724F-VH	2.495E 06	4.162E-02	2.474E-02
9c.0							

CANADA	HOLL NO	PAINT	TEMP (DEG F)	INITIAL	TEMP (DEG F)	SQUARE ROOT (RHO/ACK)	TRAR (TO)	BETA (TO)
1	1	1	1	1	1	1	1	1
2	2	2	2	2	2	2	2	2
3	3	3	3	3	3	3	3	3
4	4	4	4	4	4	4	4	4
5	5	5	5	5	5	5	5	5
6	6	6	6	6	6	6	6	6
7	7	7	7	7	7	7	7	7
8	8	8	8	8	8	8	8	8
9	9	9	9	9	9	9	9	9
10	10	10	10	10	10	10	10	10
11	11	11	11	11	11	11	11	11
12	12	12	12	12	12	12	12	12
13	13	13	13	13	13	13	13	13
14	14	14	14	14	14	14	14	14
15	15	15	15	15	15	15	15	15
16	16	16	16	16	16	16	16	16
17	17	17	17	17	17	17	17	17
18	18	18	18	18	18	18	18	18
19	19	19	19	19	19	19	19	19
20	20	20	20	20	20	20	20	20
21	21	21	21	21	21	21	21	21
22	22	22	22	22	22	22	22	22
23	23	23	23	23	23	23	23	23
24	24	24	24	24	24	24	24	24
25	25	25	25	25	25	25	25	25
26	26	26	26	26	26	26	26	26
27	27	27	27	27	27	27	27	27
28	28	28	28	28	28	28	28	28
29	29	29	29	29	29	29	29	29
30	30	30	30	30	30	30	30	30
31	31	31	31	31	31	31	31	31
32	32	32	32	32	32	32	32	32
33	33	33	33	33	33	33	33	33
34	34	34	34	34	34	34	34	34
35	35	35	35	35	35	35	35	35
36	36	36	36	36	36	36	36	36
37	37	37	37	37	37	37	37	37
38	38	38	38	38	38	38	38	38
39	39	39	39	39	39	39	39	39
40	40	40	40	40	40	40	40	40
41	41	41	41	41	41	41	41	41
42	42	42	42	42	42	42	42	42
43	43	43	43	43	43	43	43	43
44	44	44	44	44	44	44	44	44
45	45	45	45	45	45	45	45	45
46	46	46	46	46	46	46	46	46
47	47	47	47	47	47	47	47	47
48	48	48	48	48	48	48	48	48
49	49	49	49	49	49	49	49	49
50	50	50	50	50	50	50	50	50
51	51	51	51	51	51	51	51	51
52	52	52	52	52				

	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059	2060	2061	2062	2063	2064	2065	2066	2067	2068	2069	2070	2071	2072	2073	2074	2075	2076	2077	2078	2079	2080	2081	2082	2083	2084	2085	2086	2087	2088	2089	2090	2091	2092	2093	2094	2095	2096	2097	2098	2099	2100	2101	2102	2103	2104	2105	2106	2107	2108	2109	2110	2111	2112	2113	2114	2115	2116	2117	2118	2119	2120	2121	2122	2123	2124	2125	2126	2127	2128	2129	2130	2131	2132	2133	2134	2135	2136	2137	2138	2139	2140	2141	2142	2143	2144	2145	2146	2147	2148	2149	2150	2151	2152	2153	2154	2155	2156	2157	2158	2159	2160	2161	2162	2163	2164	2165	2166	2167	2168	2169	2170	2171	2172	2173	2174	2175	2176	2177	2178	2179	2180	2181	2182	2183	2184	2185	2186	2187	2188	2189	2190	2191	2192	2193	2194	2195	2196	2197	2198	2199	2200	2201	2202	2203	2204	2205	2206	2207	2208	2209	2210	2211	2212	2213	2214	2215	2216	2217	2218	2219	2220	2221	2222	2223	2224	2225	2226	2227	2228	2229	2230	2231	2232	2233	2234	2235	2236	2237	2238	2239	2240	2241	2242	2243	2244	2245	2246	2247	2248	2249	2250	2251	2252	2253	2254	2255	2256	2257	2258	2259	2260	2261	2262	2263	2264	2265	2266	2267	2268	2269	2270	2271	2272	2273	2274	2275	2276	2277	2278	2279	2280	2281	2282	2283	2284	2285	2286	2287	2288	2289	2290	2291	2292	2293	2294	2295	2296	2297	2298	2299	2300	2301	2302	2303	2304	2305	2306	2307	2308	2309	2310	2311	2312	2313	2314	2315	2316	2317	2318	2319	2320	2321	2322	2323	2324	2325	2326	2327	2328	2329	2330	2331	2332	2333	2334	2335	2336	2337	2338	2339	2340	2341	2342	2343	2344	2345	2346	2347	2348	2349	2350	2351	2352	2353	2354	2355	2356	2357	2358	2359	2360	2361	2362	2363	2364	2365	2366	2367	2368	2369	2370	2371	2372	2373	2374	2375	2376	2377	2378	2379	2380	2381	2382	2383	2384	2385	2386	2387	2388	2389	2390	2391	2392	2393	2394	2395	2396	2397	2398	2399	2400	2401	2402	2403	2404	2405	2406	2407	2408	2409	2410	2411	2412	2413	2414	2415	2416	2417	2418	2419	2420	2421	2422	2423	2424	2425	2426	2427	2428	2429	2430	2431	2432	2
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Run	Time	$M(10)$	$M(10)/M_{\text{eff}}$	$M(.97)$	$M(.97)/M_{\text{eff}}$	$M(.9210)$	$M(.9210)/M_{\text{eff}}$	ST1015
1	3.41	1.17	1.17	1.17	1.17	1.17	1.17	1.17
2	3.41	1.17	1.17	1.17	1.17	1.17	1.17	1.17
3	3.41	1.17	1.17	1.17	1.17	1.17	1.17	1.17
4	3.41	1.17	1.17	1.17	1.17	1.17	1.17	1.17
5	3.41	1.17	1.17	1.17	1.17	1.17	1.17	1.17
6	3.41	1.17	1.17	1.17	1.17	1.17	1.17	1.17
7	3.41	1.17	1.17	1.17	1.17	1.17	1.17	1.17
8	3.41	1.17	1.17	1.17	1.17	1.17	1.17	1.17
9	3.41	1.17	1.17	1.17	1.17	1.17	1.17	1.17
10	3.41	1.17	1.17	1.17	1.17	1.17	1.17	1.17
11	3.41	1.17	1.17	1.17	1.17	1.17	1.17	1.17
12	3.41	1.17	1.17	1.17	1.17	1.17	1.17	1.17
13	3.41	1.17	1.17	1.17	1.17	1.17	1.17	1.17
14	3.41	1.17	1.17	1.17	1.17	1.17	1.17	1.17
15	3.41	1.17	1.17	1.17	1.17	1.17	1.17	1.17
16	3.41	1.17	1.17	1.17	1.17	1.17	1.17	1.17
17	3.41	1.17	1.17	1.17	1.17	1.17	1.17	1.17
18	3.41	1.17	1.17	1.17	1.17	1.17	1.17	1.17
19	3.41	1.17	1.17	1.17	1.17	1.17	1.17	1.17
20	3.41	1.17	1.17	1.17	1.17	1.17	1.17	1.17
21	3.41	1.17	1.17	1.17	1.17	1.17	1.17	1.17
22	3.41	1.17	1.17	1.17	1.17	1.17	1.17	1.17
23	3.41	1.17	1.17	1.17	1.17	1.17	1.17	1.17
24	3.41	1.17	1.17	1.17	1.17	1.17	1.17	1.17
25	3.41	1.17	1.17	1.17	1.17	1.17	1.17	1.17
26	3.41	1.17	1.17	1.17	1.17	1.17	1.17	1.17
27	3.41	1.17	1.17	1.17	1.17	1.17	1.17	1.17
28	3.41	1.17	1.17	1.17	1.17	1.17	1.17	1.17
29	3.41	1.17	1.17	1.17	1.17	1.17	1.17	1.17
30	3.41	1.17	1.17	1.17	1.17	1.17	1.17	1.17
31	3.41	1.17	1.17	1.17	1.17	1.17	1.17	1.17
32	3.41	1.17	1.17	1.17	1.17	1.17	1.17	1.17
33	3.41	1.17	1.17	1.17	1.17	1.17	1.17	1.17
34	3.41	1.17	1.17	1.17	1.17	1.17	1.17	1.17
35	3.41	1.17	1.17	1.17	1.17	1.17	1.17	1.17
36	3.41	1.17	1.17	1.17	1.17	1.17	1.17	1.17
37	3.41	1.17	1.17	1.17	1.17	1.17	1.17	1.17
38	3.41	1.17	1.17	1.17	1.17	1.17	1.17	1.17
39	3.41	1.17	1.17	1.17	1.17	1.17	1.17	1.17
40	3.41	1.17	1.17	1.17	1.17	1.17	1.17	1.17
41	3.41	1.17	1.17	1.17	1.17	1.17	1.17	1.17
42	3.41	1.17	1.17	1.17	1.17			

	PIC NO	TYPE	DECLINE	MTOI	MTOI/WAGE	M(1.910)
1	1514 (268)	1.1P		MODEL WAS NOT REACHED	CENTRALINE	
2	7446 (264)	1.1P		MODEL WAS NOT REACHED	CENTRALINE	
3	7446 (265)	1.1E		MODEL WAS NOT REACHED	CENTRALINE	
4	1515 (260)	2.2S		MODEL WAS NOT REACHED	CENTRALINE	
5	7447 (264)	2.2S		MODEL WAS NOT REACHED	CENTRALINE	
6	7447 (265)	2.2S		MODEL WAS NOT REACHED	CENTRALINE	

DATA NOT YET VALID	DATA NOT YET VALID
3.25	3.25
1.14 (200)	1.14 (200)
1.24 (200)	1.24 (200)

\$13

[illegible]

**• • • • • CLASSIFIED • • • • •**

7711073

AFDC, INC.) AMVCO AVE., TENNESSEE  
VON KARMAN GAS DYNAMICS FACILITY  
50 INCH BYPFWSON), TUNNEL R

MASSA-MI CORPTEC - ZAVING

5427A

NAME	COMP	MODEL	MACH NO	WINDSIA	TOTAL R	ALPHA-MODEL	ALPHA-SECTION	ALPHA-DREHEND	ROLL-MODEL	YAW
124	2	CATFISH	7.00	400.5	1321	25.83	4.97	-30.00	-100.00	-0.00

T-10 F	O-INF	BMO-INF	MU-INF	GF/FY		SFRFF
(PSIA)	(PSIA)	(SLK/SF73)	(LM-SLO/FI2)	(FI-1)	--	IMZ -O17SF1
96.0	2.777	5.428F-QC	7.724F-MR	2.64S	OS	4.100E-O2
	.PAC					2.470F-O2

CASE NO.	PAINT TYPE	INITIAL	LC#	CEU F	SQUARE FOOT	TRAM. %	BETA (TO)
1001	PAINT	1001	1001	1001	1001	1001	1001
1002	PAINT	1002	1002	1002	1002	1002	1002
1003	PAINT	1003	1003	1003	1003	1003	1003
1004	PAINT	1004	1004	1004	1004	1004	1004
1005	PAINT	1005	1005	1005	1005	1005	1005
1006	PAINT	1006	1006	1006	1006	1006	1006
1007	PAINT	1007	1007	1007	1007	1007	1007
1008	PAINT	1008	1008	1008	1008	1008	1008
1009	PAINT	1009	1009	1009	1009	1009	1009
1010	PAINT	1010	1010	1010	1010	1010	1010
1011	PAINT	1011	1011	1011	1011	1011	1011
1012	PAINT	1012	1012	1012	1012	1012	1012
1013	PAINT	1013	1013	1013	1013	1013	1013
1014	PAINT	1014	1014	1014	1014	1014	1014
1015	PAINT	1015	1015	1015	1015	1015	1015
1016	PAINT	1016	1016	1016	1016	1016	1016
1017	PAINT	1017	1017	1017	1017	1017	1017
1018	PAINT	1018	1018	1018	1018	1018	1018
1019	PAINT	1019	1019	1019	1019	1019	1019
1020	PAINT	1020	1020	1020	1020	1020	1020
1021	PAINT	1021	1021	1021	1021	1021	1021
1022	PAINT	1022	1022	1022	1022	1022	1022
1023	PAINT	1023	1023	1023	1023	1023	1023
1024	PAINT	1024	1024	1024	1024	1024	1024
1025	PAINT	1025	1025	1025	1025	1025	1025
1026	PAINT	1026	1026	1026	1026	1026	1026
1027	PAINT	1027	1027	1027	1027	1027	1027
1028	PAINT	1028	1028	1028	1028	1028	1028
1029	PAINT	1029	1029	1029	1029	1029	1029
1030	PAINT	1030	1030	1030	1030	1030	1030
1031	PAINT	1031	1031	1031	1031	1031	1031
1032	PAINT	1032	1032	1032	1032	1032	1032
1033	PAINT	1033	1033	1033	1033	1033	1033
1034	PAINT	1034	1034	1034	1034	1034	1034
1035	PAINT	1035	1035	1035	1035	1035	1035
1036	PAINT	1036	1036	1036	1036	1036	1036
1037	PAINT	1037	1037	1037	1037	1037	1037
1038	PAINT	1038	1038	1038	1038	1038	1038
1039	PAINT	1039	1039	1039	1039	1039	1039
1040	PAINT	1040	1040	1040	1040	1040	1040
1041	PAINT	1041	1041	1041	1041	1041	1041
1042	PAINT	1042	1042	1042	1042	1042	1042
1043	PAINT	1043	1043	1043	1043	1043	1043
1044	PAINT	1044	1044	1044	1044	1044	1044
1045	PAINT	1045	1045	1045	1045	1045	1045
1046	PAINT	1046	1046	1046	1046	1046	1046
1047	PAINT	1047	1047	1047	1047	1047	1047
1048							

Object	RA	Dec	Distance (kpc)	Galactic coordinates (l, b)
NGC 1068	15 53 7.9	1 55 32.0	1.5	(15.894, 1.872)
NGC 1069	15 53 7.9	1 55 32.0	1.5	(15.894, 1.872)
NGC 1070	15 53 7.9	1 55 32.0	1.5	(15.894, 1.872)
NGC 1071	15 53 7.9	1 55 32.0	1.5	(15.894, 1.872)
NGC 1072	15 53 7.9	1 55 32.0	1.5	(15.894, 1.872)
NGC 1073	15 53 7.9	1 55 32.0	1.5	(15.894, 1.872)
NGC 1074	15 53 7.9	1 55 32.0	1.5	(15.894, 1.872)
NGC 1075	15 53 7.9	1 55 32.0	1.5	(15.894, 1.872)
NGC 1076	15 53 7.9	1 55 32.0	1.5	(15.894, 1.872)
NGC 1077	15 53 7.9	1 55 32.0	1.5	(15.894, 1.872)
NGC 1078	15 53 7.9	1 55 32.0	1.5	(15.894, 1.872)
NGC 1079	15 53 7.9	1 55 32.0	1.5	(15.894, 1.872)
NGC 1080	15 53 7.9	1 55 32.0	1.5	(15.894, 1.872)
NGC 1081	15 53 7.9	1 55 32.0	1.5	(15.894, 1.872)
NGC 1082	15 53 7.9	1 55 32.0	1.5	(15.894, 1.872)
NGC 1083	15 53 7.9	1 55 32.0	1.5	(15.894, 1.872)
NGC 1084	15 53 7.9	1 55 32.0	1.5	(15.894, 1.872)
NGC 1085	15 53 7.9	1 55 32.0	1.5	(15.894, 1.872)
NGC 1086	15 53 7.9	1 55 32.0	1.5	(15.894, 1.872)
NGC 1087	15 53 7.9	1 55 32.0	1.5	(15.894, 1.872)
NGC 1088	15 53 7.9	1 55 32.0	1.5	(15.894, 1.872)
NGC 1089	15 53 7.9	1 55 32.0	1.5	(15.894, 1.872)
NGC 1090	15 53 7.9	1 55 32.0	1.5	(15.894, 1.872)
NGC 1091	15 53 7.9	1 55 32.0	1.5	(15.894, 1.872)
NGC 1092	15 53 7.9	1 55 32.0	1.5	(15.894, 1.872)
NGC 1093	15 53 7.9	1 55 32.0	1.5	(15.894, 1.872)
NGC 1094	15 53 7.9	1 55 32.0	1.5	(15.894, 1.872)
NGC 1095	15 53 7.9	1 55 32.0	1.5	(15.894, 1.872)
NGC 1096	15 53 7.9	1 55 32.0	1.5	(15.894, 1.872)
NGC 1097	15 53 7.9	1 55 32.0	1.5	(15.894, 1.872)
NGC 1098	15 53 7.9	1 55 32.0	1.5	(15.894, 1.872)
NGC 1099	15 53 7.9	1 55 32.0	1.5	(15.894, 1.872)
NGC 1100	15 53 7.9	1 55 32.0	1.5	(15.894, 1.872)
NGC 1101	15 53 7.9	1 55 32.0	1.5	(15.894, 1.872)
NGC 1102	15 53 7.9	1 55 32.0	1.5	(15.894, 1.872)
NGC 1103	15 53 7.9	1 55 32.0	1.5	(15.894, 1.872)
NGC 1104	15 53 7.9	1 55 32.0	1.5	(15.894, 1.872)
NGC 1105	15 53 7.9	1 55 32.0	1.5	(15.894, 1.872)
NGC 1106	15 53 7.9	1 55 32.0	1.5	(15.894, 1.872)
NGC 1107	15 53 7.9	1 55 32.0	1.5	(15.894, 1.872)
NGC 1108	15 53 7.9	1 55 32.0	1.5	(15.894, 1.872)
NGC 1109	15 53 7.9	1 55 32.0	1.5	(15.894, 1.872)
NGC 1110	15 53 7.9	1 55 32.0	1.5	(15.894, 1.872)
NGC 1111	15 53 7.9	1 55 32.0	1.5	(15.894, 1.872)
NGC 1112	15 53 7.9	1 55 32.0	1.5	(15.894, 1.872)
NGC 1113	15 53 7.9	1 55 32.0	1.5	(15.894, 1.872)
NGC 1114	15 53 7.9	1 55 32.0	1.5	(15.894, 1.872)
NGC 1115	15 53 7.9	1 55 32.0	1.5	(15.894, 1.872)
NGC 1116	15 53 7.9	1 55 32.0	1.5	(15.894, 1.872)
NGC 1117	15 53 7.9	1 55 32.0	1.5	(15.894, 1.872)
NGC 1118	15 53 7.9	1 55 32.0	1.5	(15.894, 1.872)
NGC 1119	15 53 7.9	1 55 32.0	1.5	

[illegible]

514

CLASSIFIED

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 UNCLASSIFIED  
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 7/11/73

NASA-RI ORBITER HEATING  
 VA289  
 AEDC(ARO,INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL R

GROUP CONFIG MODEL MACH NO PU(SIA) IN(EG H) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREBEND ROLL-MODEL YAW  
 13A 2 ORBITER S 7.99 601.0 1321 25.03 4.97 -30.00 -180.00 -0.00

T-INF P-INF Q-INF RHO-INF MU-INF PE/FT HREF STREF  
 (DEG R) (PSIA) (FT/SFC) (SLUGS/FT<sup>3</sup>) (LR-SEC/FT<sup>2</sup>) (FT-1) (R=0.0175FT) (R=0.0175FT)  
 94.9 0.62 2.773 3835 5.427E-05 7.725E-08 2.694E 06 4.101E-02 2.479E-02

CANFRA ROLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHO/CXK) TBAR(10) BETA(10)  
 TOP(1) 7484  
 SINF(S) 8537  
 HOTTCM(B) 7938

PIC NO	TIME DELTIME	H(TO)	H(TO)/HREF	H(-9TO)/HREF	H(-90TO)/HREF	SI(TO)
M 7063(200)	19.70	1.881E-03	0.459	0.569	2.321E-03	1.122E-03
T 1931(200)	19.72	1.880E-03	0.458	0.568	2.319E-03	1.121E-03
S 5761(200)	19.72	1.880E-03	0.458	0.568	2.319E-03	1.121E-03
T 1932(200)	20.80	1.827E-03	0.445	0.552	2.254E-03	1.090E-03
M 7064(200)	20.80	1.827E-03	0.445	0.552	2.254E-03	1.090E-03
S 5762(200)	21.82	1.826E-03	0.445	0.552	2.253E-03	1.089E-03
T 1933(200)	21.82	1.778E-03	0.433	0.537	2.193E-03	1.060E-03
S 5763(200)	21.80	1.778E-03	0.433	0.537	2.193E-03	1.060E-03
M 7065(200)	21.80	1.778E-03	0.433	0.537	2.193E-03	1.060E-03
T 1934(200)	22.58	1.733E-03	0.422	0.524	2.134E-03	1.033E-03
S 5764(200)	22.58	1.733E-03	0.422	0.524	2.134E-03	1.033E-03
M 7066(200)	23.00	1.732E-03	0.422	0.523	2.134E-03	1.033E-03
T 1935(200)	23.28	1.640E-03	0.412	0.511	2.085E-03	1.008E-03
S 5765(200)	24.08	1.640E-03	0.412	0.511	2.085E-03	1.008E-03
M 7067(200)	24.08	1.640E-03	0.412	0.511	2.085E-03	1.008E-03

Group 137  
8537  
M/S

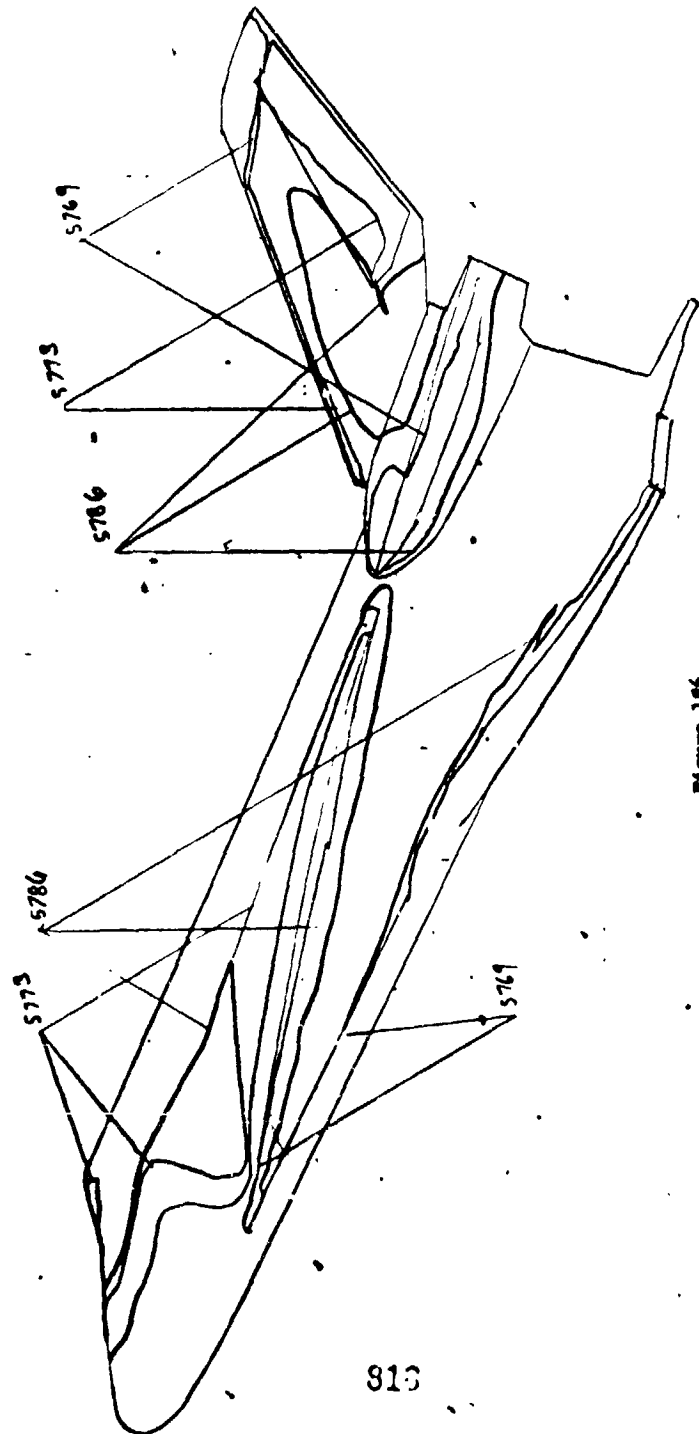


Figure 186



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• UNCLASSIFIED •  
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 7/11/73

AEDC(ARND INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 52 INCH HYPERSONIC TUNNEL R

N-S-A-R-I ORBITER HEATING

VA2R9

GROUP CONFIG MODEL MACH NO POISSIA) I0( DEG R) ALPHA-MODEL ALPHA-SECTION ALPHA-PREHEND ROLL-MODEL YAW °  
 137 2 GREITER S 7.99 502.1 1322 25.01 4.99 STREF -180.00 -0.00  
 T-INF P-INF U-INF V-INF RHO-INF MU-INF RE/FT MREF STREF  
 (DEG R) (PSIA) (FT/SEC) (SLUGS/FT³) (FT-1) (R= .0175FT) (R= .0175FT)  
 96.0 .062 2.778 3834 5.435E-05 7.72MF-08 2.69TE 06 4.105E-02 2.477E-02  
 CAMERA HOLL NO PAINT IFMP (DEG F) INITIAL ICMP (DEG F) SQUARE ROOT (RM) (CAK) TRAN(TO) HETA(TO)  
 TOP(IT) 7484  
 SIF(S) 8537 90 .0475 4.222E-02 7.8710E-02  
 MOTION(B) 7438

PIC NO TIME MULTIPLE H(TO) H(TO)/MREF H(-90T0)/MREF H(-90T0) H(-90T0)/MREF ST(TO)  
 S 5774(113) 9.51 8.58 6.279E-04 .0153 7.606E-04 .0185 7.578E-04 .0185 3.759E-04  
 M 7876(113) 9.51 8.58 6.279E-04 .0153 7.606E-04 .0185 7.578E-04 .0185 3.759E-04  
 T 1445(113) 10.59 9.65 5.918E-04 .0144 7.169E-04 .0175 7.143E-04 .0174 3.543E-04  
 S 7775(113) 11.01 9.64 5.911E-04 .0144 7.160E-04 .0174 7.143E-04 .0174 3.543E-04  
 T 1444(113) 12.09 10.75 5.657E-04 .0137 6.792E-04 .0165 6.767E-04 .0165 3.358E-04  
 S 7774(113) 12.09 10.75 5.657E-04 .0137 6.792E-04 .0165 6.767E-04 .0165 3.358E-04  
 M 7875(113) 12.09 10.75 5.657E-04 .0137 6.792E-04 .0165 6.767E-04 .0165 3.358E-04  
 T 1443(113) 13.19 11.86 5.330E-04 .0130 6.492E-04 .0158 6.445E-04 .0157 3.196E-04  
 S 7773(113) 13.19 11.86 5.330E-04 .0130 6.492E-04 .0158 6.445E-04 .0157 3.196E-04  
 M 7874(113) 13.19 11.86 5.330E-04 .0130 6.492E-04 .0158 6.445E-04 .0157 3.196E-04  
 T 1442(113) 14.27 12.93 5.113E-04 .0125 6.194E-04 .0151 6.171E-04 .0150 3.061E-04  
 S 7772(113) 14.27 12.93 5.113E-04 .0125 6.194E-04 .0151 6.171E-04 .0150 3.061E-04  
 M 7873(113) 14.27 12.93 5.113E-04 .0125 6.194E-04 .0151 6.171E-04 .0150 3.061E-04  
 T 1441(113) 15.37 14.03 4.908E-04 .0120 5.946E-04 .0145 5.924E-04 .0144 2.934E-04  
 S 7771(113) 15.37 14.03 4.908E-04 .0120 5.946E-04 .0145 5.924E-04 .0144 2.934E-04  
 M 7872(113) 15.37 14.03 4.908E-04 .0120 5.946E-04 .0145 5.924E-04 .0144 2.934E-04  
 T 1440(113) 16.44 15.11 4.730E-04 .0115 5.730E-04 .0140 5.704E-04 .0139 2.830E-04  
 S 7770(113) 16.44 15.11 4.730E-04 .0115 5.730E-04 .0140 5.704E-04 .0139 2.830E-04  
 M 7871(113) 16.44 15.11 4.730E-04 .0115 5.730E-04 .0140 5.704E-04 .0139 2.830E-04  
 T 1439(113) 17.55 16.21 4.507E-04 .0111 5.532E-04 .0135 5.512E-04 .0134 2.734E-04  
 S 7769(113) 17.55 16.21 4.507E-04 .0111 5.532E-04 .0135 5.512E-04 .0134 2.734E-04  
 M 7870(113) 17.55 16.21 4.507E-04 .0111 5.532E-04 .0135 5.512E-04 .0134 2.734E-04  
 T 1438(113) 18.65 17.31 4.419E-04 .0109 5.353E-04 .0130 5.334E-04 .0130 2.643E-04  
 S 7768(113) 18.65 17.31 4.419E-04 .0109 5.353E-04 .0130 5.334E-04 .0130 2.643E-04  
 M 7869(113) 18.65 17.31 4.419E-04 .0109 5.353E-04 .0130 5.334E-04 .0130 2.643E-04  
 T 1437(113) 19.75 18.41 4.241E-04 .0104 5.176E-04 .0125 5.152E-04 .0124 2.534E-04

517

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NASA-HI ORBITER HEATING

5A28C

AFDC (ARO, INC.) ARNOLD AFS, TENNESSEE  
VON KARMAN GAS DYNAMICS FACILITY  
50 INCH HYPERSONIC TUNNEL A

GROUP	CONFIG	MODEL	MACH NO	DN(PSIA)	TD(EG R)	ALPHA=MODEL	ALPHA=SECTOR	ALPHA=PREHEND	ROLL=MODEL	YAW
137	2	ORBITFW S	7.99	402.7	1322	25.01	4.99	-30.00	-180.00	-0.00

T-INF	P-INF	U-INF	V-INF	RMQ-INF	W-INF	RF/FT	MAFF	SREF
(DEG H)	(PSIA)	(PSIA)	(FT/SEC)	(SLUGS/FT <sup>3</sup> )	(LB-SEC/FT <sup>2</sup> )	(FT-1)	(IN-0.175FT)	(IN-0.175FT)
9.9"	0.062	2.781	38JK	5.439E-05	7.724F-08	2.709E 06	4.108E-02	2.473E-2

ROLL NO	PAIN T EMP (DEG F)	INITIAL TEMP (DEG F)	SQUARE ROOT (RHOXCCK)	TRAR(TO)	BETA'(TO)
CAMFCA TOP(T) 74P4					
A537 SIF(S)	119	R0	.0475	4.22E-02	3.8710E-02
BOTTOM(BL 733B					

PIC NO	TIME	DELTIME	H(TOI)	H(TOI)/HREF	H(.910)	H(.9TOI)/HREF	H(.902TOI)	H(.902TOI)/HREF	ST(ITO)
I	1953(1113)	19.72	4.248E-04	.0104	5.194E-04	.0126	5.175E-04	.0126	2.565E-04
M	7085(1113)	19.72	4.248E-04	.0104	5.194E-04	.0126	5.175E-04	.0126	2.565E-04
S	5783(1113)	19.75	4.245E-04	.0104	5.191E-04	.0126	5.172E-04	.0126	2.568E-04
I	1956(1113)	20.82	4.165E-04	.0101	5.043E-04	.0123	5.027E-04	.0122	2.491E-04
M	7087(1113)	20.82	4.165E-04	.0101	5.043E-04	.0123	5.027E-04	.0122	2.491E-04
M	7084(1113)	20.82	4.165E-04	.0101	5.043E-04	.0123	5.027E-04	.0122	2.491E-04
I	1955(1113)	21.50	4.055E-04	.0099	4.912E-04	.0120	4.894E-04	.0119	2.426E-04
M	7087(1113)	21.50	4.055E-04	.0099	4.912E-04	.0120	4.894E-04	.0119	2.426E-04
S	7085(1113)	21.53	4.052E-04	.0099	4.908E-04	.0120	4.891E-04	.0119	2.425E-04
I	1954(1113)	22.30	3.950E-04	.0096	4.785E-04	.0116	4.768E-04	.0116	2.362E-04
M	7086(1113)	22.30	3.950E-04	.0096	4.785E-04	.0116	4.768E-04	.0116	2.362E-04
M	7084(1113)	22.30	3.950E-04	.0096	4.785E-04	.0116	4.768E-04	.0116	2.362E-04
I	1957(1113)	22.80	3.854E-04	.0094	4.671E-04	.0114	4.653E-04	.0113	2.308E-04
M	7089(1113)	22.80	3.854E-04	.0094	4.671E-04	.0114	4.653E-04	.0113	2.308E-04
M	7087(1113)	22.80	3.854E-04	.0094	4.671E-04	.0114	4.653E-04	.0113	2.308E-04

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CENTRAL INTELLIGENCE AGENCY

Group 138  
81537  
NO

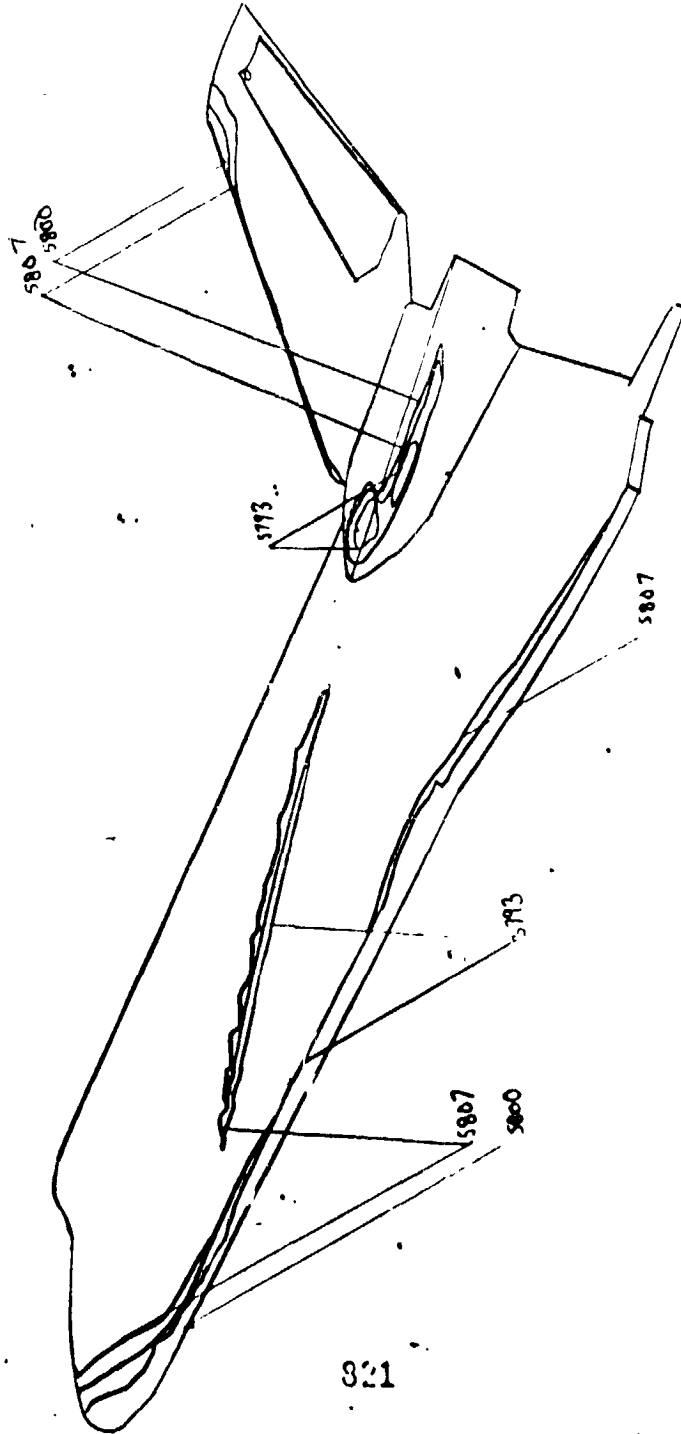
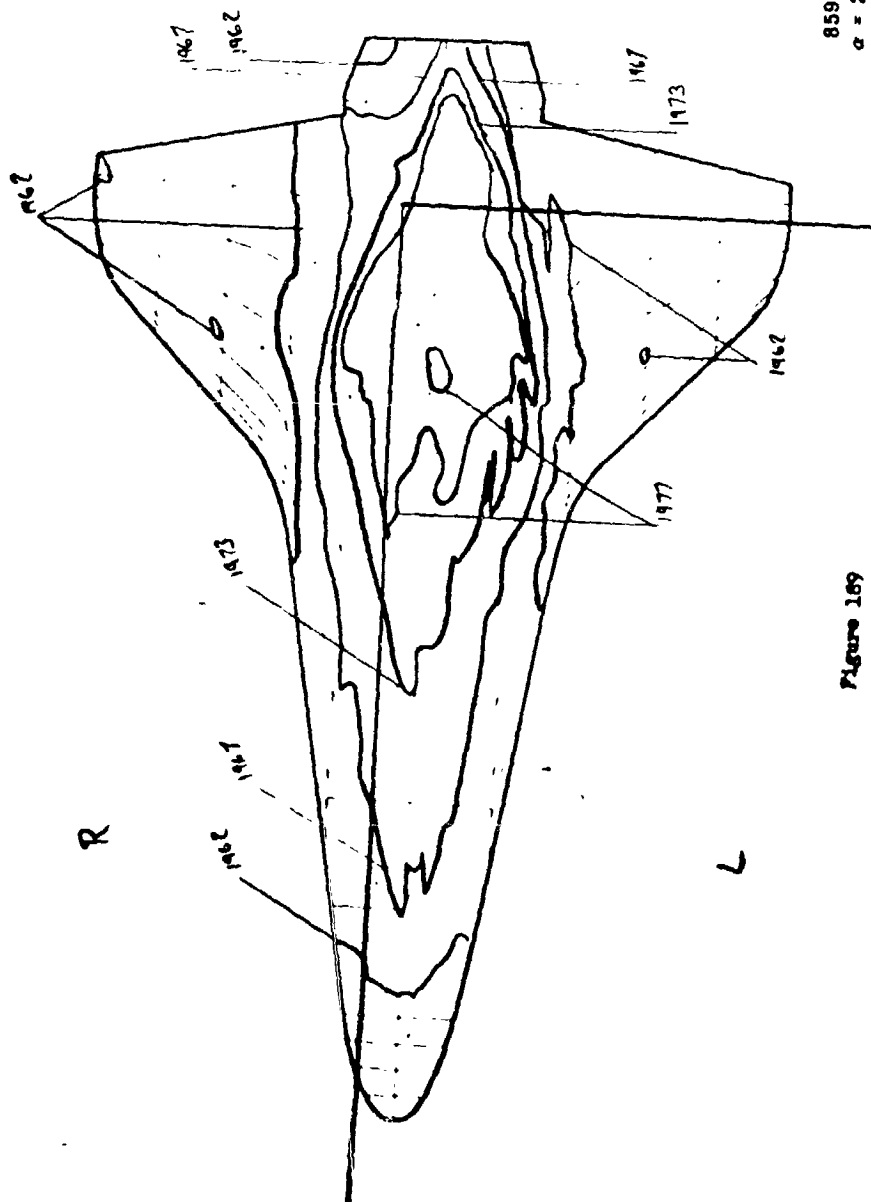


Figure 188

Group 138  
7482  
ND



8592  
 $\alpha = 25^\circ$   
 $\phi = 0^\circ$

Figure 169

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 7/11/73

AEDC(ARL-INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL R

NASA-RI ORRITER PEATING

VA289

GROUP CONFIG MODEL MACH NO P0(PSTA) T0(IDEU R) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREHEND ROLL-MODEL YAW  
 139 4 ORRITER R1 7.99 600.0 1321 25.01 4.99 STREF -30.00 -180.00 -0.00  
 I-INF 0-INF 0-INF RHO-INF MU-INF HREF STREF  
 (DEG H) (PSIA) (PSIA) (LBS/SEC) (LBS/SEC) (FT-1) (R= -0.175FI) (R= -0.175FI)  
 95.9 .062 2.769 3835 5.418E-05 7.725E-08 2.690E 04 4.098E-02 2.481E-02  
 CAMERA ROLL NO PAINT IFMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHOXCK) TBAR(TO) BETA(TO)  
 TOP(T) 7484  
 NUFF(S) 8537 80 .0510 0 0  
 MOTIC(13) 7538

PTC NO TIME DELTIME H(TO) H(TO)/HREF H(.910) H(.910)/HREF H(.902TO) H(.902TO)/HREF ST(TO)  
 T 1058(200) 1.15 MODEL HAS NOT REACHED CENTERLINE H(.910) H(.910)/HREF H(.902TO) H(.902TO)/HREF ST(TO)  
 M 7497(200) 1.15 MODEL HAS NOT REACHED CENTERLINE  
 S 5788(200) 1.15 MODEL HAS NOT REACHED CENTERLINE  
 M 7491(200) 1.15 MODEL HAS NOT REACHED CENTERLINE  
 T 1459(200) 2.25 MODEL HAS NOT REACHED CENTERLINE  
 S 5789(200) 2.25 MODEL HAS NOT REACHED CENTERLINE  
 INJECT TIME = 2.40  
 T 1460(200) 3.35 DATA NOT YET VALID  
 M 7492(200) 3.35 DATA NOT YET VALID  
 S 5793(200) 3.35  
 T 1941(200) 4.46 3.11 4.572E-03 .1115 5.668E-03 .1393 5.641E-03 .1376 2.732E-03  
 M 7494(200) 4.46 3.11 4.572E-03 .1115 5.668E-03 .1393 5.641E-03 .1376 2.732E-03  
 S 5795(200) 4.46 3.11 4.572E-03 .1115 5.668E-03 .1393 5.641E-03 .1376 2.732E-03  
 T 1942(200) 5.56 4.21 3.924E-03 .0958 4.870E-03 .1188 4.847E-03 .1182 2.347E-03  
 M 7496(200) 5.56 4.21 3.924E-03 .0958 4.870E-03 .1188 4.847E-03 .1182 2.347E-03  
 S 5797(200) 5.56 4.21 3.924E-03 .0958 4.870E-03 .1188 4.847E-03 .1182 2.347E-03  
 T 1943(200) 6.66 5.31 3.427E-03 .0853 4.335E-03 .1058 4.315E-03 .1053 2.089E-03  
 M 7498(200) 6.66 5.31 3.427E-03 .0853 4.335E-03 .1058 4.315E-03 .1053 2.089E-03  
 S 5799(200) 6.66 5.31 3.427E-03 .0853 4.335E-03 .1058 4.315E-03 .1053 2.089E-03  
 T 1944(200) 7.73 6.38 3.124E-03 .0774 3.953E-03 .0964 3.934E-03 .0960 1.906E-03  
 M 7499(200) 7.73 6.38 3.124E-03 .0774 3.953E-03 .0964 3.934E-03 .0960 1.906E-03  
 S 5800(200) 7.73 6.38 3.124E-03 .0774 3.953E-03 .0964 3.934E-03 .0960 1.906E-03  
 T 1945(200) 8.86 7.51 2.940E-03 .0717 3.645E-03 .0891 3.633E-03 .0886 1.760E-03  
 M 7500(200) 8.86 7.51 2.940E-03 .0717 3.645E-03 .0891 3.633E-03 .0886 1.760E-03  
 S 5801(200) 8.86 7.51 2.940E-03 .0717 3.645E-03 .0891 3.633E-03 .0886 1.760E-03  
 T 1946(200) 9.94 8.59 2.730E-03 .0671 3.409E-03 .0831 3.392E-03 .0827 1.642E-03  
 M 7501(200) 9.94 8.59 2.730E-03 .0671 3.409E-03 .0831 3.392E-03 .0827 1.642E-03  
 S 5802(200) 9.94 8.59 2.730E-03 .0671 3.409E-03 .0831 3.392E-03 .0827 1.642E-03

519

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7/11/73

NASA-RI ORBITER PEATING

AFOC(ARO) (AC) AMGLD AFS, TENNESSEE  
VON KAMAN GAS DYNAMICS FACILITY  
50 INCH HYPERSONIC TUNNEL R

V42P4

GROUP CONFIG MODEL MACH NO PO(PSTA) TO(DEG R) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREREND ROLL-MODEL YAW  
13P 4 CREITER R1 7.99 609.6 1321 25.01 4.99 -30.00 -180.00 -0.00  
T-INF 0-INF U-INF V-INF MU-INF RHO-INF DE/FT HREF STREF  
(DEG R) (PSIA) (PSIA) (FT/SEC) (SLUGS/FT3) (LB-SEC/FT2) (FT-1) (RZ .0175FI) (HZ .0175FI)  
95.9 .062 2.772 3835 5.422E-05 7.725E-08 2.492E 06 4.100E-02 2.479E-02  
CAMFCA ROLL NO MAINT LEWP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHOACK) TRAR(ITO) BETA(ITO)  
TUP(IT) 7484  
TIME(S) 9537  
MOTIC(M) 7538 1.536E-01 1.5527E-01

520

WIC NO	TIME	DELTIME	M(ITO)	M(ITO)/HREF	M(.9TO)	M(.9TO)/HREF	M(.902TO)	M(.902TO)/HREF	ST(ITO)
M 7494(200)	11.01	9.66	2.542E-03	.0432	3.198E-03	.0784	3.198E-03	.0780	1.548E-03
T 1467(200)	11.04	9.69	2.549E-03	.0431	3.208E-03	.0783	3.194E-03	.0779	1.546E-03
S 5797(200)	11.06	9.65	2.549E-03	.0431	3.208E-03	.0783	3.194E-03	.0779	1.546E-03
T 1544(200)	12.11	10.77	2.444E-03	.0449	3.044E-03	.0743	3.030E-03	.0739	1.467E-03
M 7501(200)	12.11	10.77	2.444E-03	.0449	3.044E-03	.0743	3.030E-03	.0739	1.467E-03
S 5794(200)	12.14	10.79	2.443E-03	.0448	3.041E-03	.0742	3.026E-03	.0738	1.465E-03
T 1569(200)	13.22	11.87	2.334E-03	.0571	2.900E-03	.0707	2.886E-03	.0704	1.397E-03
M 7501(200)	13.22	11.87	2.334E-03	.0571	2.900E-03	.0707	2.886E-03	.0704	1.397E-03
T 1477(200)	13.29	12.04	2.241E-03	.0546	2.777E-03	.0677	2.763E-03	.0674	1.337E-03
M 7502(200)	13.29	12.04	2.241E-03	.0546	2.777E-03	.0677	2.763E-03	.0674	1.337E-03
S 5800(200)	13.32	12.07	2.241E-03	.0546	2.777E-03	.0677	2.761E-03	.0673	1.336E-03
T 1571(200)	15.30	14.04	2.150E-03	.0524	2.661E-03	.0650	2.653E-03	.0647	1.284E-03
M 7501(200)	15.30	14.04	2.150E-03	.0524	2.661E-03	.0650	2.653E-03	.0647	1.284E-03
S 5801(200)	15.39	14.04	2.150E-03	.0524	2.661E-03	.0650	2.653E-03	.0647	1.284E-03
T 1572(200)	16.47	15.12	2.071E-03	.0505	2.549E-03	.0626	2.557E-03	.0623	1.237E-03
M 7504(200)	16.47	15.12	2.071E-03	.0505	2.549E-03	.0626	2.554E-03	.0623	1.236E-03
S 5802(200)	16.49	15.14	2.071E-03	.0505	2.549E-03	.0626	2.554E-03	.0623	1.236E-03
T 1573(200)	17.57	16.22	2.031E-03	.0489	2.484E-03	.0605	2.468E-03	.0602	1.194E-03
M 7505(200)	17.57	16.22	2.031E-03	.0489	2.484E-03	.0605	2.468E-03	.0602	1.194E-03
S 5803(200)	17.60	16.25	1.994E-03	.0488	2.479E-03	.0604	2.466E-03	.0601	1.194E-03
T 1574(200)	17.67	17.32	1.944E-03	.0472	2.400E-03	.0585	2.389E-03	.0582	1.156E-03
M 7504(200)	17.67	17.32	1.944E-03	.0472	2.400E-03	.0585	2.389E-03	.0582	1.156E-03
S 5804(200)	17.67	17.32	1.944E-03	.0472	2.400E-03	.0585	2.389E-03	.0582	1.156E-03
T 1575(200)	19.75	18.40	1.879E-03	.0458	2.329E-03	.0568	2.318E-03	.0565	1.121E-03
M 7505(200)	19.75	18.40	1.879E-03	.0458	2.329E-03	.0568	2.318E-03	.0565	1.121E-03

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7/11/73

NASA-RI ORBITER PEATINC

AEDC(ARO, INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL R

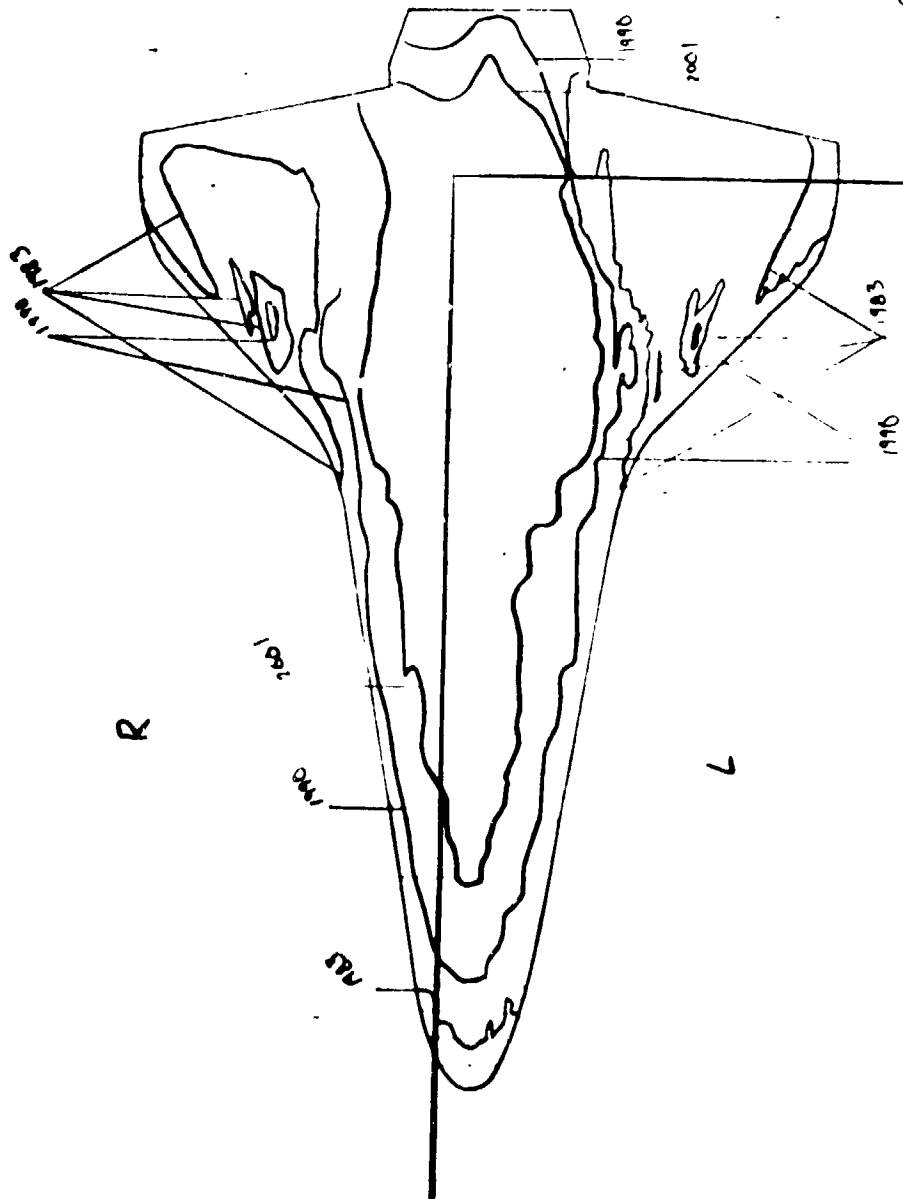
VA229

GROUP CONFIG MODEL MACH NO PO(PISA) TO(DEL R) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREBEND ROLL-MODEL YAW  
 134 134 001178 7.99 601.0 1321 25.01 4.99 -30.00 -180.00 -0.00  
 T-INF P-INF Q-INF V-INF MU-INF MU-INF PE/FT HREF STREF  
 (DEG RI) (PSIA) (PSIA) (FT/SEC) (SLUGS/FT3) (LH-SEC/FT3) (FT-1) (R= .0175FT) (M= .0175FT)  
 95.9 .062 2.773 3835 5.427E-05 7.725E-08 2.694E 06 4.101E-02 2.470E-02  
 CAMERA ROLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHOXCKX) TRAR(TO) BETA(TO)  
 TOP(T) 748  
 SINK(S) 8537 20F 80 .0519 1.536E-01 1.5527E-01  
 BOTTOM(B) 7538

PIC NO	TIME DELTIME	H(TO)/HREF	H(.910)	H(.910)/HREF	H(.902TO)	H(.902TO)/HREF	ST(TO)
M 7307(200)	15.77 18.42	.0458	2.327E-03	.0567	2.316E-03	.0565	1.120E-03
T 1974(200)	20.65 19.54	.0445	2.262E-03	.0552	2.251E-03	.0549	1.089E-03
S 5806(200)	20.65 18.50	.0445	2.262E-03	.0552	2.251E-03	.0549	1.089E-03
M 7504(200)	20.65 19.54	.0433	2.201E-03	.0537	2.190E-03	.0534	1.060E-03
T 1977(200)	21.55 20.60	.0433	2.201E-03	.0537	2.190E-03	.0534	1.060E-03
S 5807(200)	21.55 20.60	.0433	2.201E-03	.0537	2.190E-03	.0534	1.060E-03
M 7505(200)	21.55 20.60	.0422	2.145E-03	.0523	2.134E-03	.0521	1.033E-03
T 1978(200)	23.03 21.69	.0422	2.145E-03	.0523	2.134E-03	.0521	1.033E-03
M 7510(200)	23.03 21.69	.0422	2.145E-03	.0523	2.134E-03	.0521	1.033E-03
S 5808(200)	23.03 21.74	.0412	2.093E-03	.0510	2.083E-03	.0508	1.007E-03
T 1979(200)	24.13 22.78	.0412	2.093E-03	.0510	2.083E-03	.0508	1.007E-03
S 5809(200)	24.13 22.78	.0412	2.093E-03	.0510	2.083E-03	.0508	1.007E-03
M 7511(200)	24.13 22.78	.0412	2.093E-03	.0510	2.083E-03	.0508	1.007E-03

521

Group 12a  
7482  
m



8592  
 $\alpha = 25^\circ$   
 $\phi = 0^\circ$

Figure 191



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 • UNCLASSIFIED •  
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7/11/73

NASA-RI ORBITER HEATING

AEDCIARO-INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN G-3 DYNAMICS FACILITY  
 SC INCH HYPERSONIC TUNNEL #

VA2NR

GROUP CONFIDENCE MODEL MACH NO PO(P/SIA) TO(CIG R) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREBEND ROLL-MODEL YAW  
 139 5 0REITER R2 7.99 599.2 1322 25.01 4.99 -30.00 -100.00 --.00

T-INF P-INF Q-INF R-INF MU-INF RE/F' MREF STREF  
 (DEG M) (P/SIA) (P/SIA) (P/SIA) (SLUGS/F/3) (SLUGS/F/3) (F/3-L) (F/3-L) (F/3-L) (F/3-L)

94.0 .062 2.765 1034 5.408E-05 7.729E-04 2.684E-06 4.096E-02 2.483E-02

CAPSEA ROLL NO PAINT IFMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RMKCAK) TRAR(10) BETA(10)  
 TOP(1) 7484  
 SIF(1) 8537  
 MOTICM(1) 7538

PIC NO TIME DELTIME M(TO) M(TO)/MREF M(.9TO) M(.9TO)/MREF M(.9TO)/MREF ST(10)

M 7912(250) 1.15 MODEL WAS NOT REACHED CENTERLINE  
 T 1980(250) 1.18 MODEL WAS NOT REACHED CENTERLINE  
 S 5010(250) 1.18 MODEL WAS NOT REACHED CENTERLINE  
 T 1981(250) 2.25 MODEL WAS NOT REACHED CENTERLINE  
 M 7913(250) 2.25 MODEL WAS NOT REACHED CENTERLINE  
 S 5011(250) 2.28 MODEL WAS NOT REACHED CENTERLINE

INJECT TIME = 2.40

T 1982(250) 3.25 DATA NOT YET VALID  
 S 5012(250) 3.25 DATA NOT YET VALID

M 7914(250) 3.25 7.136E-03 .1741 P.993E-03 .2194 0.946E-03 .2183 4.254E-03  
 T 1983(250) 4.46 7.136E-03 .1741 P.993E-03 .2194 0.946E-03 .2183 4.254E-03  
 S 5013(250) 4.46 7.136E-03 .1741 P.993E-03 .2194 0.946E-03 .2183 4.254E-03  
 T 1984(250) 5.53 6.150E-03 .1500 7.750E-03 .1891 7.710E-03 .1881 3.665E-03  
 M 7915(250) 5.53 6.150E-03 .1500 7.750E-03 .1891 7.710E-03 .1881 3.665E-03  
 S 5014(250) 5.56 6.132E-03 .1496 7.727E-03 .1885 7.687E-03 .1876 3.655E-03  
 T 1985(250) 6.63 5.472E-03 .1395 6.895E-03 .1682 6.859E-03 .1673 3.261E-03  
 S 5015(250) 6.63 5.472E-03 .1395 6.895E-03 .1682 6.859E-03 .1673 3.261E-03  
 T 1986(250) 7.71 6.34 5.472E-03 .1395 6.895E-03 .1682 6.859E-03 .1673 3.261E-03  
 M 7916(250) 7.71 6.34 5.472E-03 .1395 6.895E-03 .1682 6.859E-03 .1673 3.261E-03  
 S 5016(250) 7.73 6.34 5.472E-03 .1395 6.895E-03 .1682 6.859E-03 .1673 3.261E-03  
 T 1987(250) 8.81 7.44 6.657E-03 .1123 5.803E-03 .1415 5.772E-03 .1408 2.744E-03  
 S 5017(250) 8.81 7.44 6.657E-03 .1123 5.803E-03 .1415 5.772E-03 .1408 2.744E-03  
 T 1988(250) 9.91 7.44 6.657E-03 .1123 5.803E-03 .1415 5.772E-03 .1408 2.744E-03  
 M 7917(250) 9.91 7.44 6.657E-03 .1123 5.803E-03 .1415 5.772E-03 .1408 2.744E-03  
 S 5018(250) 9.91 7.44 6.657E-03 .1123 5.803E-03 .1415 5.772E-03 .1408 2.744E-03  
 T 1989(250) 10.98 8.56 6.244E-03 .1044 5.417E-03 .1371 5.384E-03 .1314 2.561E-03  
 S 5019(250) 10.98 8.56 6.244E-03 .1044 5.417E-03 .1371 5.384E-03 .1314 2.561E-03  
 T 1990(250) 10.98 8.56 6.244E-03 .1044 5.417E-03 .1371 5.384E-03 .1314 2.561E-03

522

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11/11/73

WAS-PI ORBITER LEAVING

AEONCO, INC.) ARNOLD AFS., TENNESSEE  
VON KARMAN GAS DYNAMICS FACILITY  
50 INCH HYPERSONIC TUNNEL

9829

GROUP	CONFID	MODEL	MACM NO	POS(SIA)	TOT(EG R)	ALPHA=MODEL	ALPHA=PREBEND	ROLL=MODEL	YAW
110	C	GRAFFIEM R2	7.99	490.4	1321	25.01	4.99	-30.00	-0.00

Y-INF	D-INF	G-INF	HMO-INF	MU-INF	D-YFT	WRF	STREF
(DGL M)	(PSIA)	(PSIA)	(SLUGS/FIT)	(LL-SEC/FIT)	(F-1)	(RZ)	(RZ-0175FII)
98.6	.062	2.171	5.420E-05	7.727E-08	2.650E 04	4.100E-02	2.480E-02

CAMERA	MULL NO	PAINT TEMP (DEG F)	INITIAL TEMP (DEG F)	SQUARE ROOT (RHOXCAK)	TRAR(TO)	BETA(TO)
TOP(T)	7484					
SEC(S)	8537	259	79	.6535	2.184E-01	2.3509E-01

PIC NO	TIME	DELTIME	M(TOI)	M(TOI)/HREF	M(1.9TO)	M(1.9TO)/HREF	M(1.9+2TO)	M(1.9+2TO)/HREF	ST(10)
T	15491.0501	11.01	9.64	4.045E-03	5.099E-03	1.244	5.072E-03	1.237	2.411E-02
T	15491.0501	11.01	9.64	4.046E-03	5.099E-03	1.244	5.072E-03	1.237	2.411E-02
M	7521.12501	11.01	9.64	4.046E-03	5.099E-03	1.244	5.072E-03	1.237	2.411E-02
T	7522.12501	12.00	10.74	7.839E-03	4.476E-03	1.110	4.811E-03	1.174	1.87E-02
T	7523.12501	12.11	10.77	7.833E-03	4.431E-03	1.178	4.806E-03	1.172	1.84E-03
T	7524.12501	12.11	10.77	7.833E-03	4.431E-03	1.178	4.806E-03	1.172	1.84E-03
T	7525.12501	12.11	10.77	7.833E-03	4.431E-03	1.178	4.806E-03	1.172	1.84E-03
T	7526.12501	12.19	11.04	7.655E-03	4.406E-03	1.123	4.532E-03	1.117	2.77E-03
T	7527.12501	12.19	11.04	7.655E-03	4.406E-03	1.123	4.532E-03	1.117	2.77E-03
T	7528.12501	12.22	11.07	7.651E-03	4.401E-03	1.122	4.517E-03	1.116	2.75E-03
T	7529.12501	12.29	12.04	7.449E-03	4.406E-03	1.074	4.411E-03	1.069	2.083E-03
T	7530.12501	12.29	12.04	7.449E-03	4.406E-03	1.074	4.411E-03	1.069	2.083E-03
T	7531.12501	12.29	12.04	7.449E-03	4.406E-03	1.074	4.411E-03	1.069	2.083E-03
T	7532.12501	12.29	12.04	7.449E-03	4.406E-03	1.074	4.411E-03	1.069	2.083E-03
T	7533.12501	12.29	12.04	7.449E-03	4.406E-03	1.074	4.411E-03	1.069	2.083E-03
T	7534.12501	12.29	12.04	7.449E-03	4.406E-03	1.074	4.411E-03	1.069	2.083E-03
T	7535.12501	12.29	12.04	7.449E-03	4.406E-03	1.074	4.411E-03	1.069	2.083E-03
T	7536.12501	12.29	12.04	7.449E-03	4.406E-03	1.074	4.411E-03	1.069	2.083E-03
T	7537.12501	12.29	12.04	7.449E-03	4.406E-03	1.074	4.411E-03	1.069	2.083E-03
T	7538.12501	12.29	12.04	7.449E-03	4.406E-03	1.074	4.411E-03	1.069	2.083E-03
T	7539.12501	12.29	12.04	7.449E-03	4.406E-03	1.074	4.411E-03	1.069	2.083E-03
T	7540.12501	12.29	12.04	7.449E-03	4.406E-03	1.074	4.411E-03	1.069	2.083E-03
T	7541.12501	12.29	12.04	7.449E-03	4.406E-03	1.074	4.411E-03	1.069	2.083E-03
T	7542.12501	12.29	12.04	7.449E-03	4.406E-03	1.074	4.411E-03	1.069	2.083E-03
T	7543.12501	12.29	12.04	7.449E-03	4.406E-03	1.074	4.411E-03	1.069	2.083E-03
T	7544.12501	12.29	12.04	7.449E-03	4.406E-03	1.074	4.411E-03	1.069	2.083E-03
T	7545.12501	12.29	12.04	7.449E-03	4.406E-03	1.074	4.411E-03	1.069	2.083E-03
T	7546.12501	12.29	12.04	7.449E-03	4.406E-03	1.074	4.411E-03	1.069	2.083E-03
T	7547.12501	12.29	12.04	7.449E-03	4.406E-03	1.074	4.411E-03	1.069	2.083E-03
T	7548.12501	12.29	12.04	7.449E-03	4.406E-03	1.074	4.411E-03	1.069	2.083E-03
T	7549.12501	12.29	12.04	7.449E-03	4.406E-03	1.074	4.411E-03	1.069	2.083E-03
T	7550.12501	12.29	12.04	7.449E-03	4.406E-03	1.074	4.411E-03	1.069	2.083E-03
T	7551.12501	12.29	12.04	7.449E-03	4.406E-03	1.074	4.411E-03	1.069	2.083E-03</

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7/11/73

NASA-RI (AFT) HEATING AEDCI(ARO-INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL R

VA289

GROUP CONFIG MODEL MACH NO POI(PSIA) TO(DEG R) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREBF D ROLL-MODEL YAW  
 139 5 OREITER H2 7.59 600.8 1321 25.01 4.99 -30.00 -180.00 -0.00

T-INF P-INF Q-INF V-INF RHO-INF MU-INF RE/FT HREF STRECH  
 (DEG R) (PSIA) (PSIA) (FT/SEC) (SLUGS/FT<sup>3</sup>) (LB-SEC/FT<sup>2</sup>) (FI-1) (R= .0175EI) (R= .0175EI)  
 26.0 .062 2.772 3836 5.423E-05 7.727E-03 2.692E 06 4.101E-02 2.479E-02

CAMERA ROLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHODACK) TBAR(10) BETA(10)

TOP(T) 7484  
 SIDE(S) 8537 250 .0535 2.184E-01 2.3509E-01  
 BOTTOM(B) 7938

PIC NO	TIME DELTIME	M(10)	M(10)/HREF	M(.910)	M(.910)/HREF	M(.90210)	M(.90210)/HREF	ST(10)
T 1998(250)	20.87	2.846E-03	.0694	3.587E-03	.0875	3.568E-03	.0870	1.696E-03
S 5928(250)	20.87	2.846E-03	.0694	3.587E-03	.0875	3.568E-03	.0870	1.696E-03
M 7930(250)	20.87	2.846E-03	.0694	3.587E-03	.0875	3.568E-03	.0870	1.696E-03
T 1999(250)	21.55	2.771E-03	.0613	3.492E-03	.0851	3.474E-03	.0847	1.650E-03
M 7931(250)	21.55	2.771E-03	.0613	3.492E-03	.0851	3.474E-03	.0847	1.650E-03
S 5929(250)	21.58	2.769E-03	.0615	3.490E-03	.0851	3.472E-03	.0846	1.649E-03
T 2000(250)	23.05	2.700E-03	.0658	3.402E-03	.0830	3.385E-03	.0825	1.607E-03
M 7930(250)	23.05	2.700E-03	.0658	3.402E-03	.0830	3.385E-03	.0825	1.607E-03
S 5932(250)	23.05	2.700E-03	.0658	3.402E-03	.0830	3.385E-03	.0825	1.607E-03
T 2001(250)	24.15	2.634E-03	.0642	3.319E-03	.0809	3.302E-03	.0805	1.568E-03
M 7933(250)	24.15	2.634E-03	.0642	3.319E-03	.0809	3.302E-03	.0805	1.568E-03
S 5934(250)	25.23	2.574E-03	.0627	3.243E-03	.0791	3.227E-03	.0787	1.532E-03
T 2002(250)	25.25	2.572E-03	.0627	3.242E-03	.0790	3.225E-03	.0786	1.531E-03
S 5932(250)	25.25	2.572E-03	.0627	3.242E-03	.0790	3.225E-03	.0786	1.531E-03
MODEL HAS LEFT CENTERLINE								
T 2003(250)	26.33	2.518E-03	.0613	3.171E-03	.0773	3.155E-03	.0769	1.497E-03
S 5933(250)	26.33	2.518E-03	.0613	3.171E-03	.0773	3.155E-03	.0769	1.497E-03
M 7935(250)	26.33	2.516E-03	.0613	3.171E-03	.0773	3.155E-03	.0769	1.497E-03

524

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Group 140  
7482  
100

8592  
 $\alpha = 25^\circ$   
 $\phi = 0^\circ$

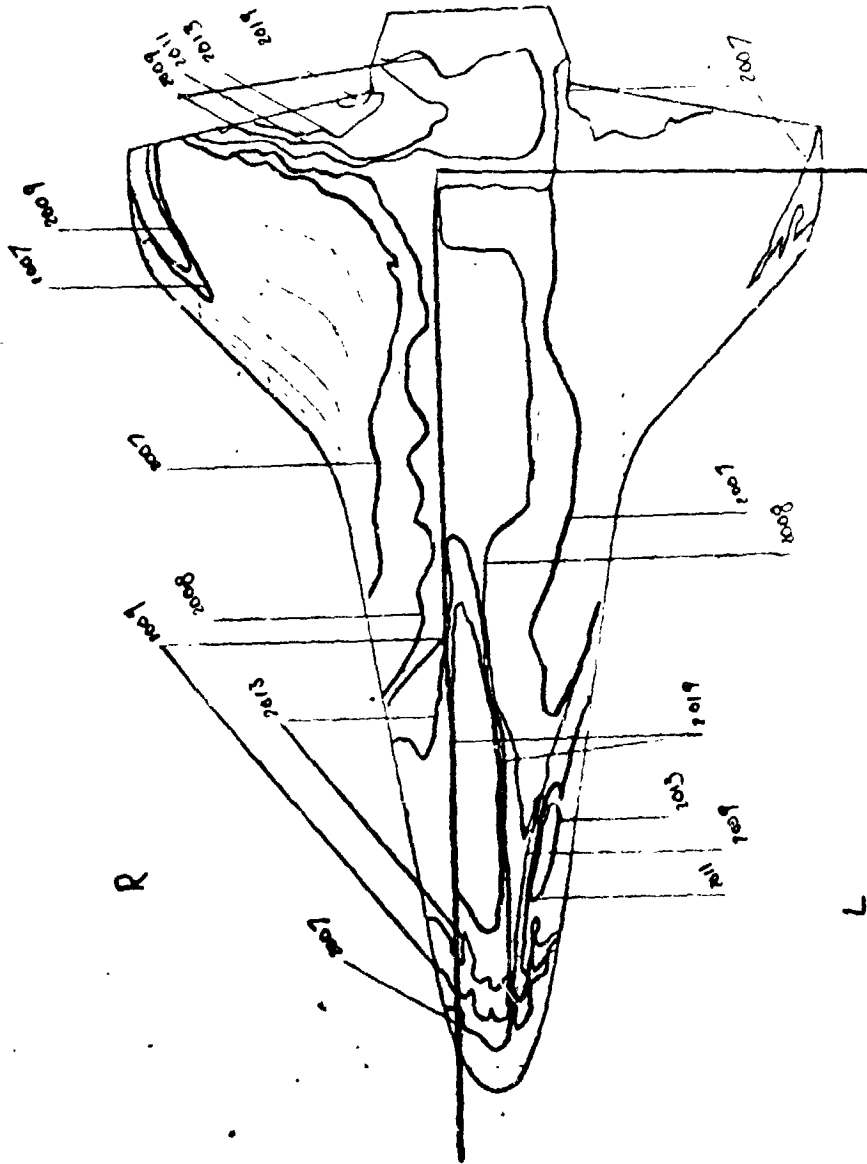


Figure 192

Group 170  
8561  
1958

4525  
 $\alpha = 25^\circ$   
 $\phi = 0^\circ$

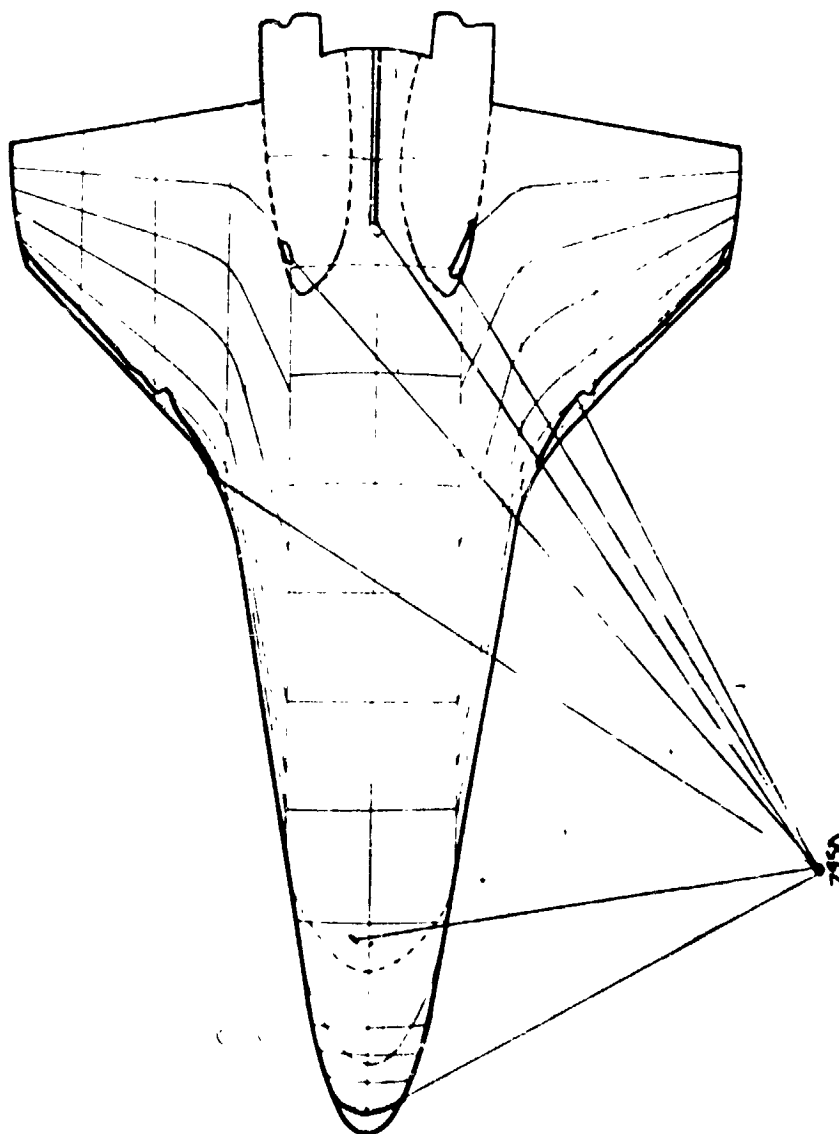


Figure 193

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7/11/73

NASA-WI ORBITER HEATING

VA2R9

AEDC(ARO, INC.) ARNOLD AFS, TENNESSEE  
VON KARMAN GAS DYNAMICS FACILITY  
50 INCH HYPERSONIC TUNNEL H

GROUP CONFIG MODEL MACH NO PO(PSIA) TO(DEG R) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREBEND ROLL-MODEL YAW  
140 6 ORBITER R3 7.99 600.1 1329 25.01 4.99 -30.00 -180.00 -0.00  
T-INF P-INF U-INF V-INF W-INF RQ-INF MU-INF RF/FT HREF STREF  
TO(EG R) (PSIA) (FT/SEC) (SLUGS/FT3) (LB-SEC/FT3) (FT-1) (RZ .0175F1) (R# .0175F1)  
96.6 .062 2.759 3847 5.184E-05 7.774E-08 2.664E 06 4.103E-02 2.490E-02  
CAMERA ROLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHOXCK) THAR(TO) BETA(TO)  
TOP(T) 7484 250 78 .0535 0 0  
SIDE(S) 8537  
MOTCH(B) 7938

PIC NO TIME DELTIME H(TO) H(TO)/HREF H(.9TO) HREF H(.9TO) H(.902TO) H(.902TO)/HREF ST(TO)  
T 2004(250) 1.15 MODEL HAS NOT REACHED CENTERLINE H(TO) NOT YET VALID  
H 7936(250) 1.15 MODEL HAS NOT REACHED CENTERLINE DATA NOT YET VALID  
S 5934(250) 1.18 MODEL HAS NOT REACHED CENTERLINE DATA NOT YET VALID  
T 2005(250) 2.25 MODEL HAS NOT REACHED CENTERLINE 7.118E-03 .1734  
H 7937(250) 2.25 MODEL HAS NOT REACHED CENTERLINE 7.049E-03 .1727  
S 5935(250) 2.28 MODEL HAS NOT REACHED CENTERLINE 7.049E-03 .1727  
INJECT TIME = 2.00 6.110E-03 .1488  
T 2006(250) 3.25 DATA NOT YET VALID 6.110E-03 .1488  
S 5936(250) 3.25 DATA NOT YET VALID 6.091E-03 .1484  
H 7938(250) 4.46 5.436E-03 .1324  
T 2007(250) 4.46 5.436E-03 .1324  
S 5937(250) 4.46 5.436E-03 .1324  
H 7939(250) 4.46 5.436E-03 .1324  
T 2008(250) 4.46 5.436E-03 .1324  
S 5938(250) 4.46 5.436E-03 .1324  
H 7940(250) 4.46 5.436E-03 .1324  
T 2009(250) 4.46 5.436E-03 .1324  
S 5939(250) 4.46 5.436E-03 .1324  
H 7941(250) 4.46 5.436E-03 .1324  
T 2010(250) 4.46 5.436E-03 .1324  
S 5940(250) 4.46 5.436E-03 .1324  
H 7942(250) 4.46 5.436E-03 .1324  
T 2011(250) 4.46 5.436E-03 .1324  
S 5941(250) 4.46 5.436E-03 .1324  
H 7943(250) 4.46 5.436E-03 .1324  
T 2012(250) 4.46 5.436E-03 .1324  
S 5942(250) 4.46 5.436E-03 .1324  
H 7944(250) 4.46 5.436E-03 .1324

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7/11/73

NASA-RI ORBITER PEATING AEDC(ARO, INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL R  
 VA209

GROUP CONFIG MODEL MACH NO PO(PSIA) TO(DEG R) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREBEND ROLL-MODEL YAW  
 140 6 GREITER R3 7.99 600.8 1330 25.01 4.99 -30.00 -180.00 -.00  
 T-INF P-INF Q-INF V-INF RHO-INF MU-INF RF/FT MREF STREF  
 (DEG R) (PSIA) (FT/SEC) (SLUGS/FT3) (LB-SEC/FT2) (FT-1) (R=.0175FI, (R=.0175FI)  
 96.4 .062 2.772 38.4 5.99E-05 7.77E-08 2.667E 06 4.105E-02 2.489E-02  
 CAMERA ROLL NO PAINT IFMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHOXCK) TRAR(TO) BETA(TO)  
 TOP(T) 7484  
 SIDF(S) 8537  
 40TIC(18) 7538  
 .0535 2.173E-01 2.3355E-01

PIC NO TIME DELTIME H(TO) HREF H(10) H(910) H(.910)/HREF H(.902TO) HREF ST(TO)  
 5 5943(250) 10.59 9.64 4.025E-03 .0980 5.069E-03 .1233 5.937E-03 .1227 2.403E-03  
 T 2013(250) 11.01 9.64 4.019E-03 .0979 5.058E-03 .1232 5.031E-03 .1225 2.400E-03  
 M 7945(250) 11.01 9.64 4.019E-03 .0979 5.058E-03 .1232 5.031E-03 .1225 2.400E-03  
 F 2014(250) 12.09 10.74 3.813E-03 .0929 4.796E-03 .1168 4.772E-03 .1162 2.276E-03  
 M 7946(250) 12.09 10.74 3.813E-03 .0929 4.796E-03 .1168 4.772E-03 .1162 2.276E-03  
 F 2015(250) 12.11 10.77 3.808E-03 .0928 4.791E-03 .1167 4.766E-03 .1161 2.273E-03  
 M 7947(250) 13.19 11.84 3.631E-03 .0885 4.568E-03 .1113 4.545E-03 .1107 2.169E-03  
 F 2016(250) 13.19 11.84 3.631E-03 .0885 4.568E-03 .1113 4.545E-03 .1107 2.169E-03  
 M 7948(250) 13.19 11.84 3.631E-03 .0885 4.568E-03 .1113 4.545E-03 .1107 2.169E-03  
 F 2017(250) 14.27 12.92 3.473E-03 .0847 4.373E-03 .1065 4.351E-03 .1060 2.075E-03  
 M 7949(250) 14.27 12.92 3.473E-03 .0847 4.373E-03 .1065 4.351E-03 .1060 2.075E-03  
 F 2018(250) 14.29 12.94 3.473E-03 .0846 4.369E-03 .1064 4.347E-03 .1059 2.073E-03  
 M 7950(250) 15.37 14.02 3.337E-03 .0813 4.198E-03 .1023 4.177E-03 .1017 1.993E-03  
 F 2019(250) 15.37 14.02 3.337E-03 .0813 4.198E-03 .1023 4.177E-03 .1017 1.993E-03  
 M 7951(250) 16.47 15.12 3.213E-03 .0783 4.042E-03 .0984 4.022E-03 .0979 1.918E-03  
 F 2020(250) 16.47 15.12 3.213E-03 .0783 4.042E-03 .0984 4.022E-03 .0979 1.918E-03  
 M 7952(250) 17.57 16.22 3.102E-03 .0755 3.903E-03 .0950 3.883E-03 .0946 1.851E-03  
 F 2021(250) 17.57 16.22 3.102E-03 .0755 3.903E-03 .0950 3.883E-03 .0946 1.851E-03  
 M 7953(250) 17.57 16.22 3.102E-03 .0755 3.903E-03 .0950 3.883E-03 .0946 1.851E-03  
 F 2022(250) 18.65 17.30 3.004E-03 .0731 3.779E-03 .0920 3.760E-03 .0916 1.792E-03  
 M 7954(250) 18.65 17.30 3.004E-03 .0731 3.779E-03 .0920 3.760E-03 .0916 1.792E-03  
 F 2023(250) 18.67 17.32 3.002E-03 .0731 3.777E-03 .0920 3.757E-03 .0915 1.792E-03  
 M 7955(250) 18.67 17.32 3.002E-03 .0731 3.777E-03 .0920 3.757E-03 .0915 1.792E-03

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7/11/73

NASA-R1 ORBITER HEATING

VA2A9

AEDC(ARO, INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL B

GROUP	CONFIG	MODEL	MACH NO	PO(PSIA)	TO(DEG R)	ALPHA-MODEL	ALPHA-SECTOR	ALPHA-PREPEND	ROLL-MODEL	YAW
140	6	ORBITER P3	7.99	601.1	1330	25.01	4.99	-30.00	-180.00	-0.00
T-1-F	P-INF	Q-INF	V-INF	RHO-INF	WU-INF	RF/FT	MREF	STREF		
(DEG R)	(PSIA)	(FT/SEC)	(FT/SEC)	(SLUGS/FT3)	(LB-SEC/FT2)	(FT-1)	(R= .0175FI)	(R= .0175FI)		
96.6	.062	2.774	3844	5.392E-05	7.776E-08	2.668E 06	4.106E-02	2.668E-02		
CAMERA	ROLL NO	PAINT TEMP (DEG F)	INITIAL TEMP (DEG F)	SQUARE ROOT (RHO/CXK)	TBAR(TO)	BETA(TO)				
TOP(T)	7484									
SIDFIS)	8537									
WOTTCM(B)	7938									

PIC NO	TIME RELTIME	H(TO)	H(TO)/HREF	H(.9TO)	H(.9TO)/HREF	H(.902TO)	H(.902TO)/HREF	ST(TO)
S 5451(250)	19.70	18.35	.0710	3.669E-03	.0893	3.651E-03	.0889	1.740E-03
T 2021(250)	19.62	18.47	.0708	3.657E-03	.0890	3.638E-03	.0886	1.734E-03



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7/11/73

AEDC(ARO, INC.) ARNOLD AFS, TENNESSEE  
VON KARMAN GAS DYNAMICS FACILITY  
50 INCH HYPERSONIC TUNNEL R

NASA-RI ORBITER HEATING  
VA209

GROUP CONFIG MODEL MACH NO POI(PSIA) TO(DEG R) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREBEND ROLL-MODEL YAW  
141 2 ORBITER S 8.00 863.7 1360 30.05 -0.05 -30.00 -180.00 -0.00

T-TAF P-TAF Q-TAF V-TAF MU-INF RMQ-INF RE/FT MREF STREF  
(DEG R) (PSIA) (FT/SEC) (SLUGS/FT3) (LB-SEC/FT2) (FT-L) (R= .0175FI) (R= .0175FI)  
92.5 .0188 3.963 3892 7.531E-05 7.935E-08 3.493E 06 4.928E-02 2.110E-02

CAL-PRA MOLL NO PAINT IFWP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHOXCAK) TBAR(TO) BETA(TO)  
TOP(T) 7484  
SICF(S) 8537  
MOTICH(B) 7538

0.0555 0 0

PIC NO TIME DELTME HITO) HREF H(,910) H(,910) HREF H(,913TO) HREF ST(TO)

3 5952(400) .35 MODEL HAS NOT REACHED CENTERLINE  
T 2022(400) .48 MODEL HAS NOT REACHED CENTERLINE

INJECT TIME 2.40

T 2023(400)	12.79	11.44	1707	1.123E-02	.2283	1.077E-02	.2190	3.523E-03
S 5953(400)	12.79	11.44	1707	1.123E-02	.2283	1.077E-02	.2190	3.523E-03
M 7954(400)	12.79	11.44	1707	1.123E-02	.2283	1.077E-02	.2190	3.523E-03
T 2024(400)	13.89	12.54	1630	1.073E-02	.2180	1.029E-02	.2091	3.364E-03
S 5954(400)	13.89	12.54	1630	1.073E-02	.2180	1.029E-02	.2091	3.364E-03
M 7955(400)	13.89	12.54	1630	1.073E-02	.2180	1.029E-02	.2091	3.364E-03
T 2025(400)	14.99	13.64	1563	1.029E-02	.2090	9.865E-03	.2005	3.225E-03
S 5955(400)	14.99	13.64	1563	1.029E-02	.2090	9.865E-03	.2005	3.225E-03
M 7956(400)	14.99	13.64	1563	1.029E-02	.2090	9.865E-03	.2005	3.225E-03
MODEL HAS LEFT CENTERLINE								
M 7957(400)	15.64	14.72	1504	9.902E-03	.2011	9.498E-03	.1929	3.103E-03
T 2026(400)	15.64	14.72	1504	9.902E-03	.2011	9.498E-03	.1929	3.103E-03
S 5956(400)	15.64	14.72	1504	9.902E-03	.2011	9.498E-03	.1929	3.103E-03
T 2027(400)	17.17	15.82	1451	9.551E-03	.1941	9.161E-03	.1862	2.995E-03
S 5957(400)	17.17	15.82	1451	9.551E-03	.1941	9.161E-03	.1862	2.995E-03
M 7958(400)	17.17	15.82	1451	9.551E-03	.1941	9.161E-03	.1862	2.995E-03
T 2028(400)	18.25	16.90	1404	9.235E-03	.1878	8.865E-03	.1801	2.897E-03
S 5958(400)	18.25	16.90	1404	9.235E-03	.1878	8.865E-03	.1801	2.897E-03
M 7959(400)	18.25	16.90	1404	9.235E-03	.1878	8.865E-03	.1801	2.897E-03
T 2029(400)	19.32	17.97	1361	8.941E-03	.1820	8.595E-03	.1746	2.808E-03
S 5959(400)	19.32	17.97	1361	8.941E-03	.1820	8.595E-03	.1746	2.808E-03
M 7960(400)	19.32	17.97	1361	8.941E-03	.1820	8.595E-03	.1746	2.808E-03
T 2030(400)	20.42	19.07	1321	8.698E-03	.1767	8.344E-03	.1695	2.726E-03
S 5960(400)	20.42	19.07	1321	8.698E-03	.1767	8.344E-03	.1695	2.726E-03
M 7961(400)	20.42	19.07	1321	8.698E-03	.1767	8.344E-03	.1695	2.726E-03

528

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7/11/73

NASA-RI ORBITER HEATING

VA295

AEDC(ARO, INC.) ARNOLD AFS, TENNESSEE  
VON KARMAN GAS DYNAMICS FACILITY  
50 INCH HYPERSONIC TUNNEL A

GROUP CONFIG MODEL MACH NO PO(PSIA) TO( DEG R) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREBEND ROLL-MODEL YAW  
14) 2 ORBITER S 8.00 862.0 1359 36.05 -05 -30.00 -100.00 -0.00  
T-INF P-INF U-INF V-INF MU-INF RE/FT MREF STREF  
(DEG R) (PSIA) (PSIA) (FT/SEC) (SLUGS/FT<sup>3</sup>) (LBS-SEC/FT<sup>2</sup>) (F<sup>3</sup>) (RZ) (RZ) (RZ)  
9P.C 3.955 3890 7.522E-05 7.928E-08 3.691E 06 4.922E-02 2.111E-02  
CAMERA ROLL 1.0 PAINT 1FUP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHOXCK) TBAR(TO) RETA(TO)  
TOP(T) 7484  
SINF(S) 8537  
MUTICH(B) 7538 400 90 0555 3.903E-01 5.1101E-01

PIC NO TIME DELTIME H(TO) H(TO)/MREF H(,9TO) HREF H(,913TO) H(,913TO)/MREF ST(TO)  
T 2031(400) 21.50 20.15 6.322E-03 0.265 8.463E-03 0.1719 8.111E-03 0.1649 2.652E-03  
M 2032(400) 21.50 20.15 6.322E-03 0.265 8.463E-03 0.1719 8.111E-03 0.1649 2.652E-03  
S 5861(400) 21.52 20.18 6.322E-03 0.265 8.458E-03 0.1718 8.113E-03 0.1648 2.650E-03  
S 5862(400) 22.55 21.20 6.169E-03 0.253 8.250E-03 0.1676 7.914E-03 0.1607 2.583E-03  
T 2032(400) 22.70 21.35 6.147E-03 0.249 8.221E-03 0.1670 7.886E-03 0.1602 2.576E-03

8537  
GP 143  
CWC

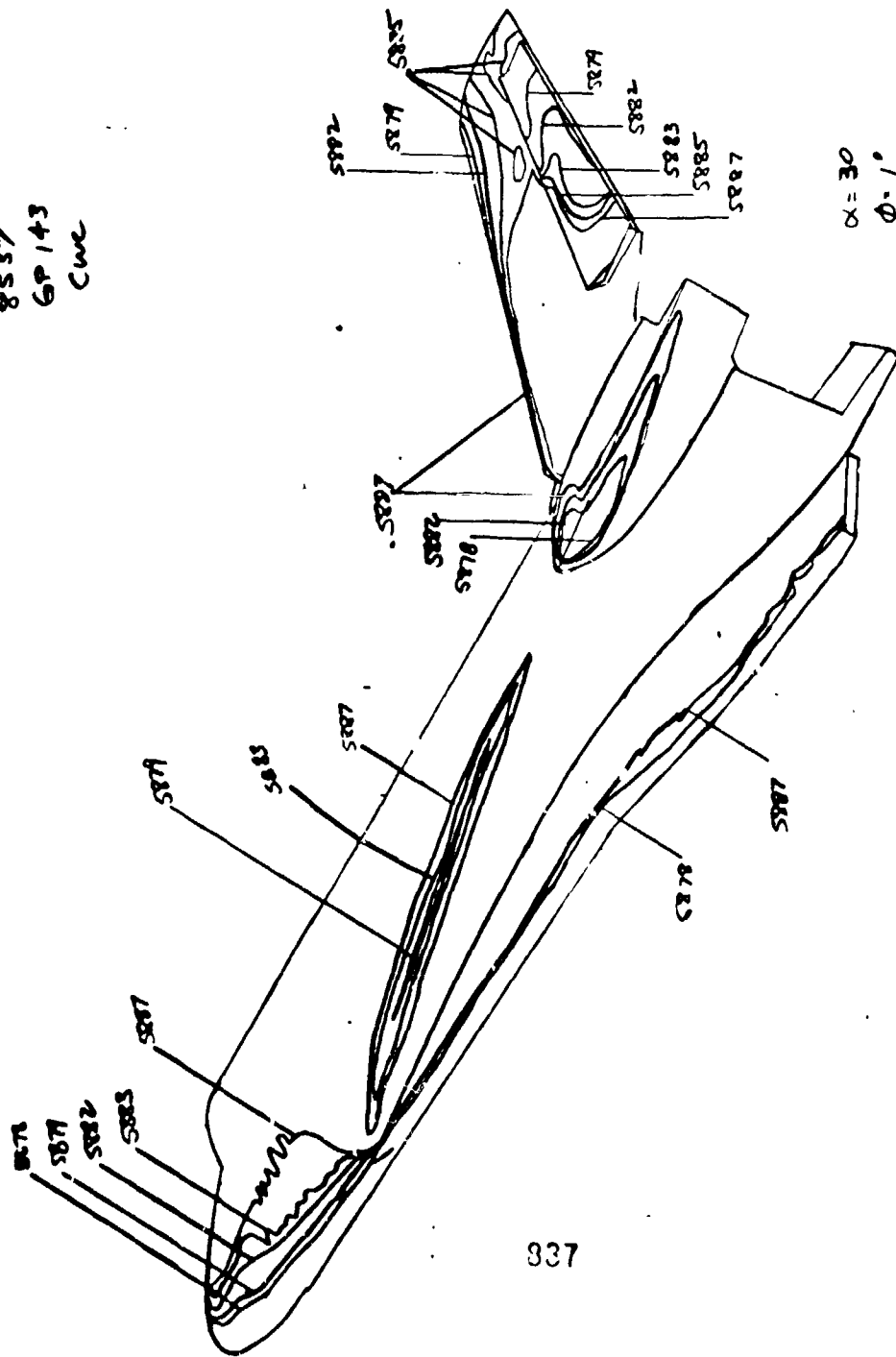


Figure 194

Comp 143  
7938  
ms

$\alpha = 30^\circ$   
 $\phi = 1^\circ$

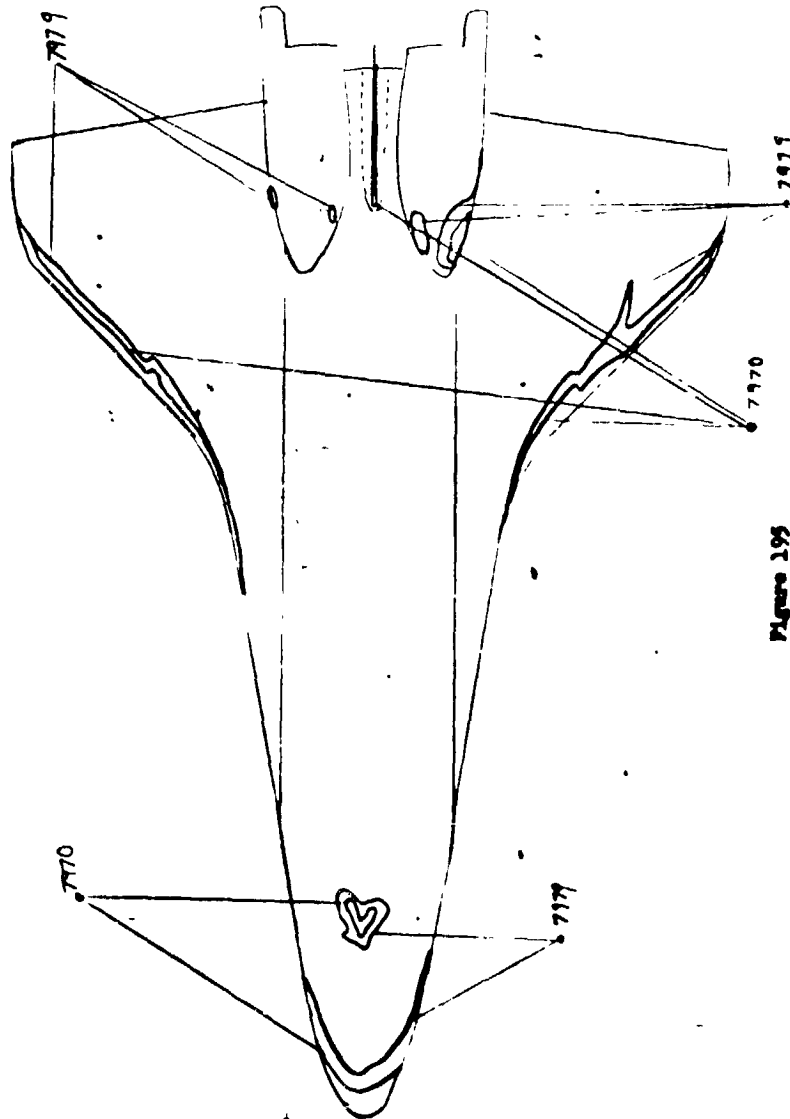


Figure 195

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7/11/73

AEDCI(ADP, INC.) ARNOLD AFS, TENNESSEE  
VON KARMAN GAS DYNAMICS FACILITY  
50 INCH HYPERSONIC TUNNEL 9

NASA-MI ORBITER HEATING

VAPOR

GROUP CONFIG MODEL MACH NO PO(PISA) TO(EG M) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREBEND ROLL-MODEL YAW  
1-1 2 ORBITER S 8.00 859.9 1353 30.04 -0.05 -30.00 -182.00 1.00  
T-INF 0-TNF 0-TNF 0-TNF MU-INF MU-INF HF/FT HREF STREF  
(DEG H) (PSIA) (FT/SEC) (SLUGS/FT<sup>3</sup>) (LR-SEC/FT<sup>2</sup>) (FT-1) (RZ -0.175FT) (RZ -0.175FT)  
99.0 3.946 3861 7.538E-05 7.843E-08 3.707E 06 4.912E-02 2.108E-02  
CAMERA ROLL NO PAINT (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHOXCK) TRAR(10) BETAITO)  
TOP(T) 7484  
SIDE(S) 8537  
MOTTCM(B) 7538

MI(.910)/HREF MI(.913TO) MI(.913TO)/HREF ST(10)

PIC NO TIME DELTIME M(10) M(10)/HREF M(10) MI(.910)/HREF MI(.913TO) MI(.913TO)/HREF ST(10)  
T 2046(150) 1-15 MODEL WAS NOT REACHED CENTERLINE  
S 4676(150) 1-15 MODEL WAS NOT REACHED CENTERLINE  
M 7667(150) 1-15 MODEL WAS NOT REACHED CENTERLINE  
T 2047(150) 2-23 MODEL WAS NOT REACHED CENTERLINE  
M 7668(150) 2-23 MODEL WAS NOT REACHED CENTERLINE  
S 5077(150) 2-25 MODEL WAS NOT REACHED CENTERLINE  
INJECT TIME = 2.3M

DATA NOT YET VALID

DATA NOT YET VALID

DATA NOT YET VALID

DATA NOT YET VALID

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DATA NOT YET VALID

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530



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 \* UNCLASSIFIED \*  
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7/11/73

AFDC(ARD) INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL R

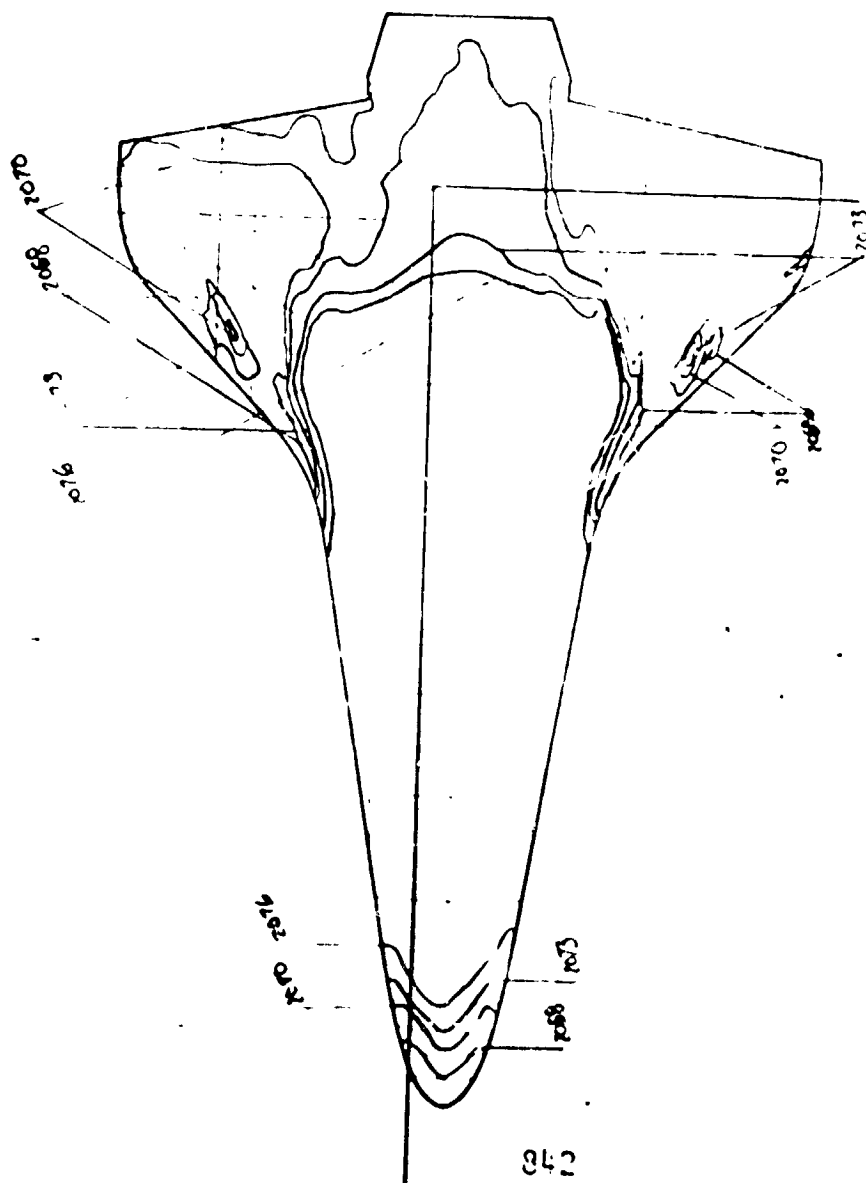
MASA-R1 ORBITER PEATING  
 VA249

GROUP CONFIG MODEL MACH NO POI(PSIA) TO(DEG R) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREBEND ROLL-MODEL YAW  
 141 2 CRETECH S 8.00 860.7 1353 30.04 -.05 -.05 -30.00 -102.00 1.00  
 T-1NF P-1NF Q-1NF V-1NF MU-1NF MU-1NF HF/F1 MREF STREF  
 (DEG H) (PSIA) (PSIA) (FT/SEC) (SLUGS/FT3) (LB-SEC/FT3) (FT-1) (R2) .0175FI1 (R2) .0175FI1  
 0.1 .002 3.949 3.949 7.442E-05 7.442E-05 3.709E 04 4.915E-02 2.108E-02  
 CARFEA MULL NO PAINT IFMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHO/CRK) TRANHITO BETA(10)  
 74RA  
 8537  
 150 78 .0496 0.835E-02 0.4200E-02  
 MUTICH(R) 7538

PTC NO TIME DELTIME M(10) M(10)/MREF M(-9TO)/MREF M(-9TO) M(-913TO) M(-913TO)/MREF ST(10)  
 1 2003(150) 20.12 18.70 0.635E-04 0.0196 1.173E-03 0.0239 1.142E-03 0.0232 4.001E-04  
 5 2003(150) 20.12 18.70 0.635E-04 0.0196 1.173E-03 0.0239 1.142E-03 0.0232 4.001E-04  
 8 7080(150) 20.12 18.70 0.635E-04 0.0196 1.173E-03 0.0239 1.142E-03 0.0232 4.001E-04

Group 144  
7482  
cm

8595  
 $\omega = 30^\circ$   
 $\phi = 0^\circ$



**Figure 196**



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7/11/73

NASA-RI ORBITER HEATING

VA299

AEDCIARO, INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL R

GROUP CONFIG MODEL MACH NO PO(PSIA) TO(DEG R) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREBEND ROLL-MODEL YAW  
 144 4 ORBITER R1 9.00 860.5 1353 30.05 -.05 -30.00 -180.00 -.00

T-1NF P INF Q-INF V-INF RMO-INF MU-INF RE/FT HREF STREF  
 (DEG R) (PSIA) (PSIA) (FT/SEC) (SLUGS/FT<sup>3</sup>) (LB-SEC/FT<sup>2</sup>) (FT-1) (R=.0175ET) (R=.0175ET)

98.0 .08E 3.949 3081 7.443E-05 7.893E-08 3.709E 06 4.914E-02 2.107E-02

CAMERA ROLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RMORCKK) TBAR(10) BETA(10)

TOP(1) 7484 79 0  
 SIDE(S) 8537 .0550 0  
 MOTION(M) 7938 0

PTC NO TIME DELTIME H(10) H(10)/HREF H(10) H(10) H(10)/HREF ST(10)

T 2064(150) 1.15 MODEL HAS NOT REACHED CENTERLINE  
 US 5094(150) 1.15 MODEL HAS NOT REACHED CENTERLINE  
 M 7095(150) 1.15 MODEL HAS NOT REACHED CENTERLINE  
 T 2065(150) 2.25 MODEL HAS NOT REACHED CENTERLINE  
 US 5095(150) 2.25 MODEL HAS NOT REACHED CENTERLINE  
 M 7096(150) 2.25 MODEL HAS NOT REACHED CENTERLINE

INJECT TIME = 2.40

T 2066(150) 3.33 DATA NOT YET VALID

M 7097(150) 3.33 DATA NOT YET VALID

US 5096(150) 3.33 DATA NOT YET VALID

T 2067(150) 4.43 1.274E-02 .2591 1.661E-02 .3379 1.610E-02 .3255 5.348E-03

US 5097(150) 4.43 1.274E-02 .2591 1.661E-02 .3379 1.600E-02 .3255 5.348E-03

M 7098(150) 4.43 1.274E-02 .2591 1.661E-02 .3379 1.600E-02 .3255 5.348E-03

T 2068(150) 5.51 1.096E-02 .2231 1.430E-02 .2909 1.377E-02 .2802 4.603E-03

US 5098(150) 5.51 1.096E-02 .2231 1.430E-02 .2909 1.377E-02 .2802 4.603E-03

M 7099(150) 5.51 1.096E-02 .2231 1.430E-02 .2909 1.377E-02 .2802 4.603E-03

T 2069(150) 6.61 4.749E-03 .1983 1.271E-02 .2587 1.225E-02 .2492 4.093E-03

US 5099(150) 6.61 4.749E-03 .1983 1.271E-02 .2587 1.225E-02 .2492 4.093E-03

M 7100(150) 6.61 4.749E-03 .1983 1.271E-02 .2587 1.225E-02 .2492 4.093E-03

T 2070(150) 7.71 6.34 8.865E-03 .1804 1.156E-02 .2352 1.114E-02 .2266 3.722E-03

US 5000(150) 7.71 6.34 8.865E-03 .1804 1.156E-02 .2352 1.114E-02 .2266 3.722E-03

M 7091(150) 7.71 6.34 8.865E-03 .1804 1.156E-02 .2352 1.114E-02 .2266 3.722E-03

T 2071(150) 8.81 7.44 8.198E-03 .1668 1.069E-02 .2175 1.030E-02 .2095 3.441E-03

US 5001(150) 8.81 7.44 8.198E-03 .1668 1.069E-02 .2175 1.030E-02 .2095 3.441E-03

M 7092(150) 8.81 7.44 8.198E-03 .1668 1.069E-02 .2175 1.030E-02 .2095 3.441E-03

T 2072(150) 9.89 8.54 7.651E-03 .1556 9.979E-03 .2030 9.671E-03 .1955 3.211E-03

US 5002(150) 9.89 8.54 7.651E-03 .1556 9.979E-03 .2030 9.671E-03 .1955 3.211E-03

M 7093(150) 9.89 8.54 7.651E-03 .1556 9.979E-03 .2030 9.671E-03 .1955 3.211E-03

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7/11/73

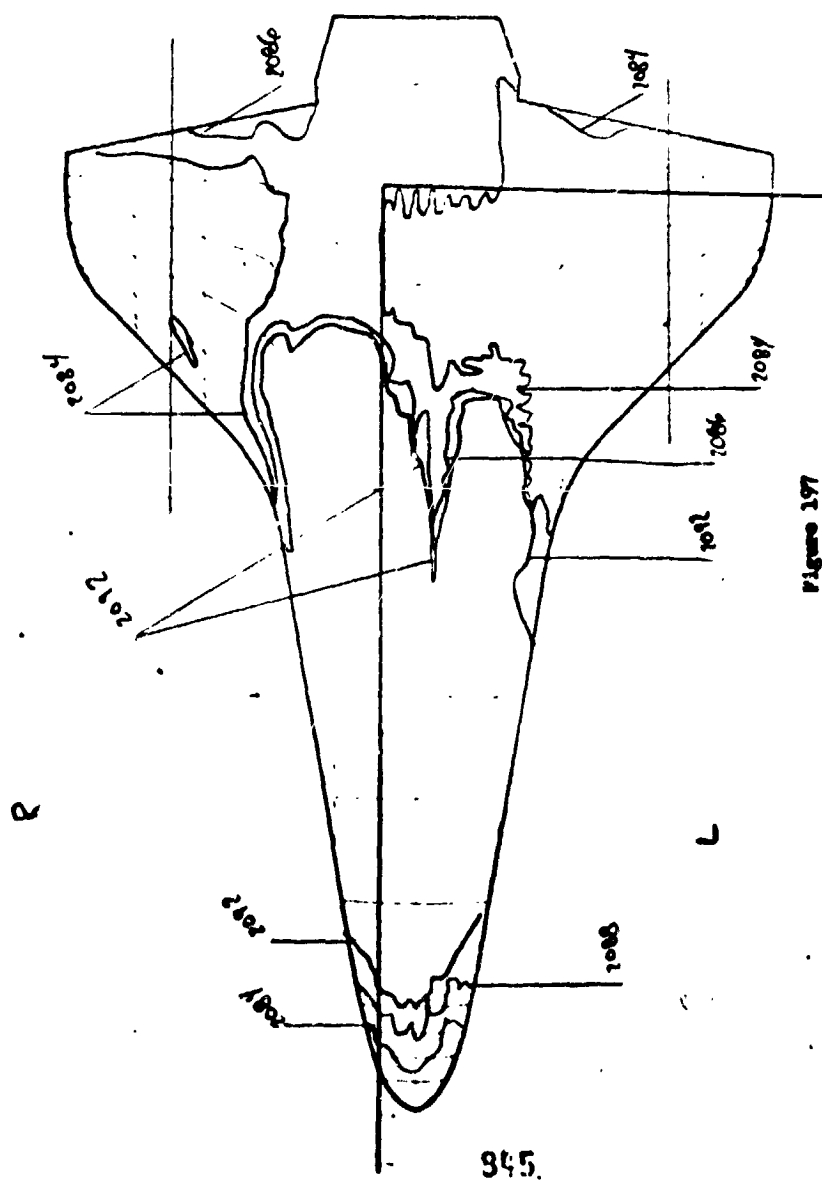
NASA-PI ORBITER PEATING  
AEDCIAR(ING.) ARNOLD AFS, TENNESSEE  
VON KARMAN GAS DYNAMICS FACILITY  
50 INCH HYPERSONIC TUNNEL R

VA289

GROUP	CONFIG	MODEL	MACH NO	PO(PISA)	TO(CEG R)	ALPHA-MODEL	ALPHA-SECTOR	ALPHA-PREBEND	ROLL-MODEL	YAW
144	A	ORBITER R1	8.00	861.2	1353	30.05	-0.05	-30.00	-180.00	-0.00
T-1NF	P-1NF	Q-1NF	V-1NF	RMO-1NF	MU-1NF	RE-1NF	HREF	STREF		
(DEG R)	(PSIA)	(FT/SEC)	(SLUGS/FT <sup>3</sup> )	(LB-SEC/FT <sup>2</sup> )	(FT-1)	(R-1)	(R-1)	(R-1)		
98.0	0.88	3.952	3881	7.551E-05	7.991E-08	3.714E 06	4.916E-02	2.106E-02		
CAMERA	ROLL NO	PAINT TEMP (DEG F)	INITIAL TEMP (DEG F)	SQUARE ROOT (RHOXCK)	TRAR(ITO)	BETA(ITO)				
TOP(IT)	7484		79	0.550	3.330E-01	4.0647E-01				
SIDE(S)	8537									
MOTIC*(BI)	7938									
PTC NO	TIME	DELTIME	M(ITO)	M(ITO)/HREF	M(.910)	M(.910)/HREF	M(.913TO)	M(.913TO)/HREF	ST(ITO)	
US 5902(350)	9.51	8.56	7.640E-03	.1554	9.964E-03	.2027	9.597E-03	.1952	3.207E-03	
T 2073(350)	10.59	9.64	7.201E-03	.1465	9.391E-03	.1910	9.046E-03	.1840	3.022E-03	
US 5903(350)	10.59	9.64	7.201E-03	.1465	9.391E-03	.1910	9.046E-03	.1840	3.022E-03	
M 7594(350)	10.59	9.64	7.201E-03	.1465	9.391E-03	.1910	9.046E-03	.1840	3.022E-03	
T 2074(350)	12.09	10.74	6.822E-03	.1388	8.897E-03	.1810	8.569E-03	.1743	2.864E-03	
US 5904(350)	12.09	10.74	6.822E-03	.1388	8.897E-03	.1810	8.569E-03	.1743	2.864E-03	
M 7595(350)	12.09	10.74	6.822E-03	.1388	8.897E-03	.1810	8.569E-03	.1743	2.864E-03	
US 5905(350)	13.17	11.84	6.503E-03	.1293	8.482E-03	.1725	8.170E-03	.1662	2.729E-03	
M 7596(350)	13.17	11.84	6.503E-03	.1293	8.482E-03	.1725	8.170E-03	.1662	2.729E-03	
T 2075(350)	13.19	11.84	6.477E-03	.1321	8.473E-03	.1723	8.161E-03	.1660	2.726E-03	
US 5906(350)	13.19	11.84	6.477E-03	.1321	8.473E-03	.1723	8.161E-03	.1660	2.726E-03	
T 2076(350)	14.27	12.92	6.220E-03	.1265	8.112E-03	.1650	7.814E-03	.1589	2.610E-03	
M 7597(350)	14.27	12.92	6.220E-03	.1265	8.112E-03	.1650	7.814E-03	.1589	2.610E-03	
US 5907(350)	14.29	12.94	6.214E-03	.1264	8.105E-03	.1648	7.806E-03	.1588	2.607E-03	
T 2077(350)	15.14	14.02	5.971E-03	.1214	7.787E-03	.1584	7.501E-03	.1525	2.505E-03	
US 5908(350)	15.14	14.02	5.971E-03	.1214	7.787E-03	.1584	7.501E-03	.1525	2.505E-03	
M 7598(350)	15.14	14.02	5.971E-03	.1214	7.787E-03	.1584	7.501E-03	.1525	2.505E-03	
T 2078(350)	16.47	15.12	5.749E-03	.1169	7.498E-03	.1525	7.222E-03	.1469	2.412E-03	
US 5909(350)	16.47	15.12	5.749E-03	.1169	7.498E-03	.1525	7.222E-03	.1469	2.412E-03	
M 7599(350)	16.47	15.12	5.749E-03	.1169	7.498E-03	.1525	7.222E-03	.1469	2.412E-03	
US 5910(350)	17.55	16.22	5.555E-03	.1130	7.245E-03	.1473	6.978E-03	.1419	2.311E-03	
T 2079(350)	17.57	16.22	5.551E-03	.1129	7.239E-03	.1472	6.973E-03	.1418	2.309E-03	
US 5911(350)	17.57	16.22	5.551E-03	.1129	7.239E-03	.1472	6.973E-03	.1418	2.309E-03	

195  
Group  
7482  
mad

8595  
 $\alpha = 30^\circ$   
 $\phi = 0^\circ$



**WASA-RI ORRYTER PEAYING**

WA289

AFDC(ARO,INC.) ARNOLD AFS, TENNESSEE  
VON KAHMAN GAS DYNAMICS FACILITY  
50 INCH HYPERSONIC TUNNEL A

KARMAN GAS DYNAMICS FACILITY  
50 INCH HYPERSONIC TUNNEL A

GROUP	CONFIG	MODEL	MACH NO	PO(PSIA)	TO(DEC H)	ALPHA-MODEL	ALPHA-SECTOR	ALPHA-PREBEND	ROLL-MODEL	YAW
145	5	QRETFM HP	4.00	859.3	1349	30.05	-0.05	-30.00	-180.00	-0.00

[illegible]

ROLL NO	PAINT IFWP (DEG F)	INITIAL TEMP (DEG F)	SQUARE ROOT (RHOXCXK)	TRARITO	BETAITO
7484					
9537	35°	79			
7521			.0550		0

PIC NO	TIME DELT	W(T0)	W(T0)/WREF	W(.9T0)	W(.9T0)/WREF	W(.913T0)	W(.913T0)/WREF	ST(T0)
2080(350)	1.15							

PIC NO.	TIME	DELTIME	W(TO)	W(TO)/WREF	W(STO)
2040(150)	1.15		MODEL HAS	NOT REACHED	CENTERLINE
5511(150)	1.15		MODEL HAS	NOT REACHED	CENTERLINE
5501(150)	1.15		MODEL HAS	NOT REACHED	CENTERLINE
2041(150)	2.05		MODEL HAS	NOT REACHED	CENTERLINE
5511(150)	2.05		MODEL HAS	NOT REACHED	CENTERLINE
5501(150)	2.05		MODEL HAS	NOT REACHED	CENTERLINE

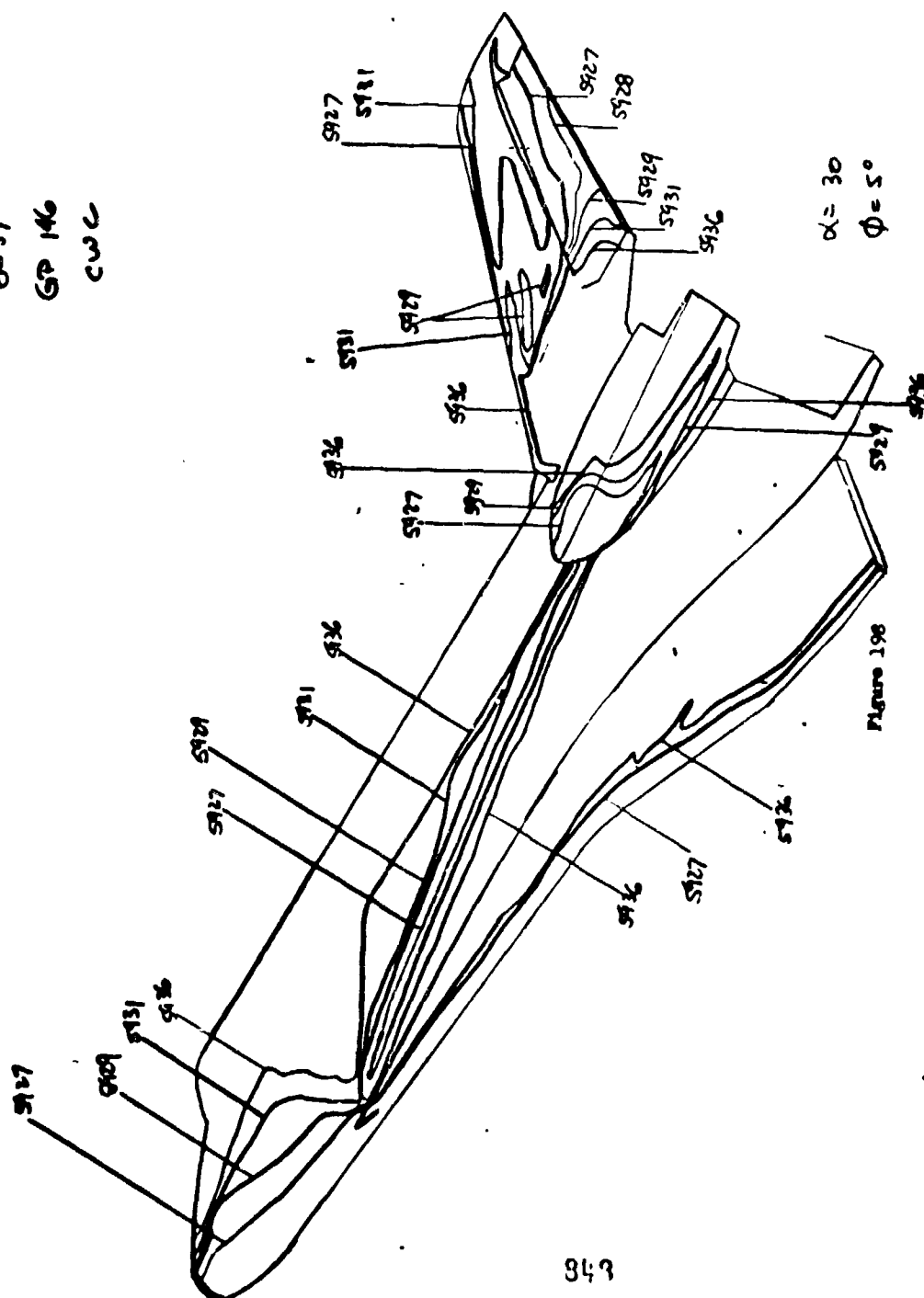
DATA	NOT	YET	VALID
2000 (25)	3	25	
5512 (25)	3	25	
2000 (25)	3	25	
5512 (25)	3	25	

[illegible]

• UNCLASSIFIED •



8537  
GP 146  
CWC











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7/11/73

NASA-PI ORBITER PEATING  
 AEDC(ARN-INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL R

VAP29

GROUP CONFIG MODEL MACH NO PO (PSIA) TO (DEG R) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREBEND ROLL-MODEL YAW  
 147 1 UREITER E 8.00 459.2 1353 30.04 -0.04 -30.00 -180.00 -0.00

T-TAF P-TAF U-TAF V-TAF RHO-INF MU-INF PE/ET MREF STREF  
 (DEG R) (PSIA) (PSIA) (FT/SEC) (SLUGS/FT3) (LBS-SEC/FT2) (FT-1) (IN-0.0175FT) (IN-0.0175FT)  
 90.0 0.00 3.943 3801 7.513E-15 7.291E-09 3.705E 06 4.910E-02 2.109E-02

CAMERA ROLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (HMOACR) TBAH(TO) BETA(TO)  
 TOP(T) 7484  
 SIDE(S) 8537 500 78 0 0 0  
 BOTTOM(B) 7538 0.0542

PIC NO TYPE DELTIME H(TO) HREF H(-91TO) M(-913TO) M(-913TO)/HREF ST(TO)

5 5941(500) 1.15 MODEL HAS NOT REACHED CENTERLINE  
 T 2111(500) 1.12 MODEL HAS NOT REACHED CENTERLINE  
 M 2032(500) 1.18 MODEL HAS NOT REACHED CENTERLINE  
 M 2033(500) 2.25 MODEL HAS NOT REACHED CENTERLINE  
 T 2112(500) 2.28 MODEL HAS NOT REACHED CENTERLINE  
 S 5942(500) 2.28 MODEL HAS NOT REACHED CENTERLINE

INJECT TIME = 2.40

DATA NOT YET VALID

DATA NOT YET VALID

DATA NOT YET VALID

DATA NOT YET VALID

DATA NOT YET VALID

DATA NOT YET VALID

DATA NOT YET VALID

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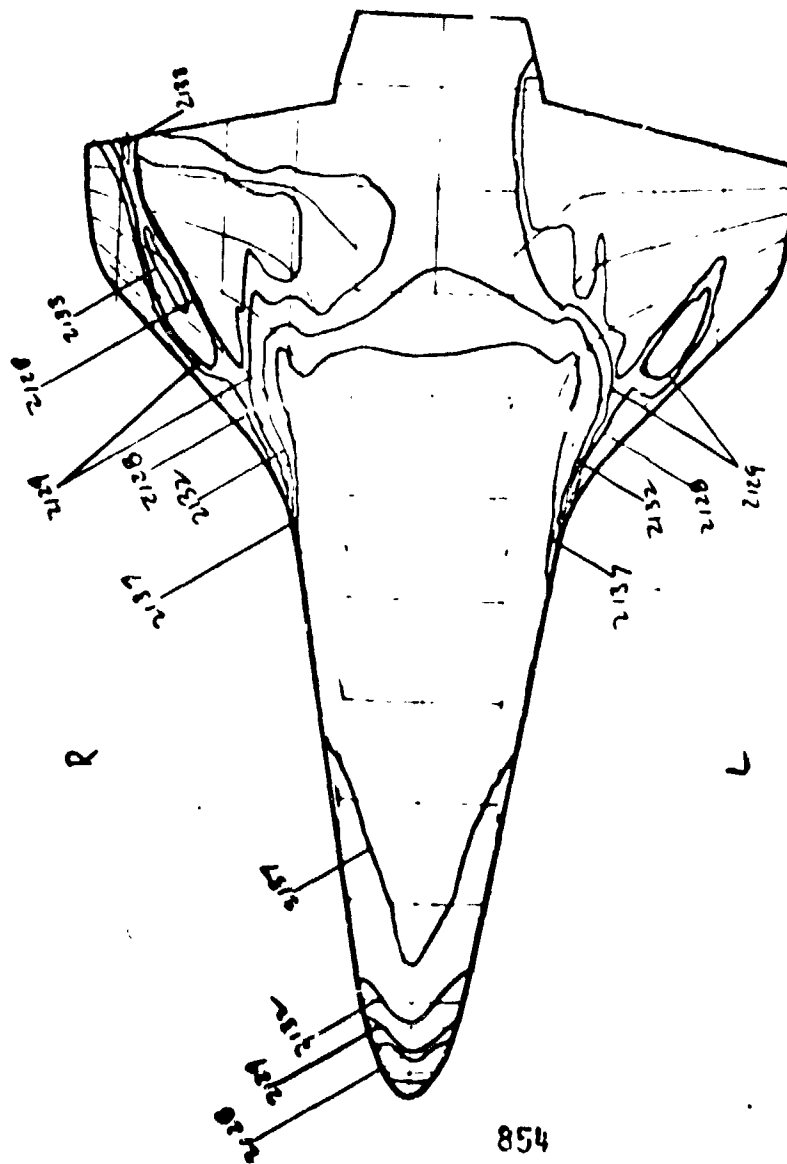
539

055



7482 148  
GP 148

8598  
Q - 35  
P - 0



854





Group 149  
8537  
NO

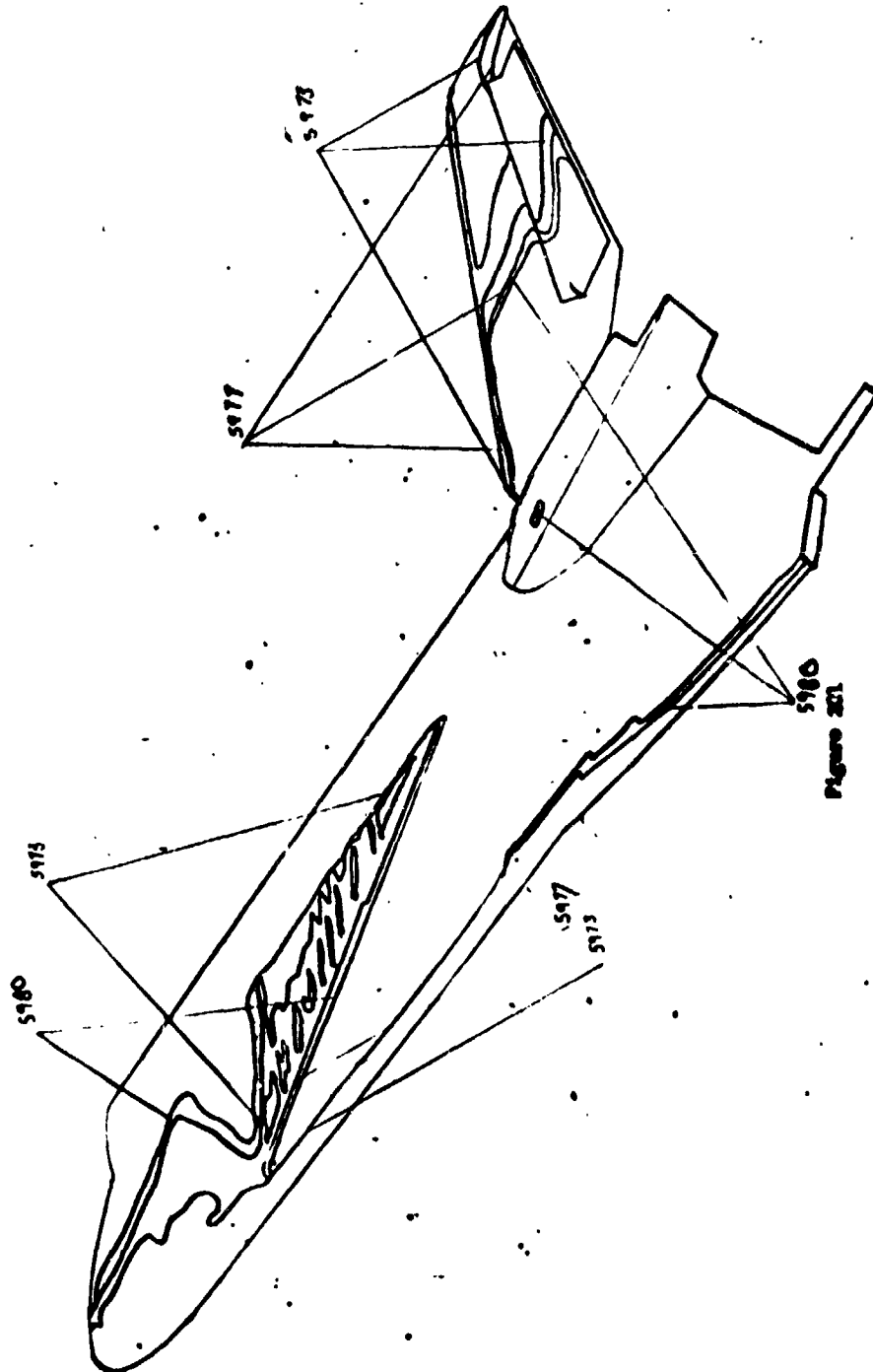
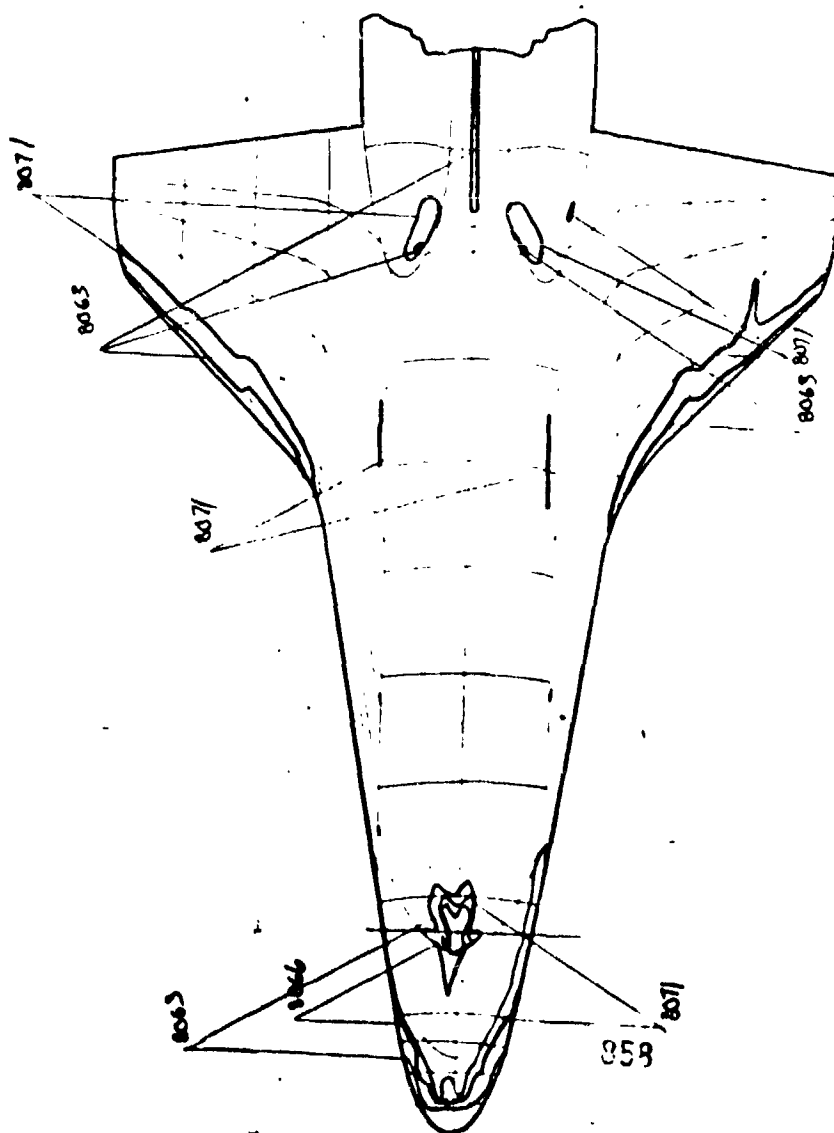


Figure 201

4531  
 $\alpha = 35^\circ$   
 $\phi = 0^\circ$



**Figure 202**



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7/11/73

NASA-RI ORBITER HEATING

AEDC(ARO-INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL A

VA289

GROUP	CONFID	MODEL	MACH NO	DO (PSIA)	TO (DEG R)	ALPHA-MODEL	ALPHA-SECTION	ALPHA-PREREND	ROLL-MODEL	YAW
149	2	CRITTER S	8.00	859.5	1356	35.04	-5.04	-30.00	-180.00	-0.00
T-INF	P-INF	Q-INF	V-INF	RHO-INF	4U-INF	RF/FT	HREF	STREF		
(DEG R)	(PSIA)	(FT/SEC)	(SLUGS/FT <sup>3</sup> )	(LR-SEC/FT <sup>2</sup> )	(FT-1)	(H=)	(H=)	(H=)		
99.1	0.08	3.944	3887	7.527E-05	7.500E-08	3.700E-05	4.912E-02	2.110E-02		
CAMERA	ROLL NO	PAINT TEMP (DEG F)	INITIAL TEMP (DEG F)	SQUARE ROOT (RHO/CKX)	TRAR(TO)	BETA(TO)				
TOP(T)	7494									
SIGF(S)	8537									
MOTICM(B)	7938									

PIC NO	TIME DELTIME	M(TO)	M(TO)/MREF	M(-910)	M(-910)/MREF	M(-923TO)	M(-923TO)/MREF	ST(TO)
M 0000(131)	1.15	MODEL HAS NOT REACHED CENTERLINE						
T 2130(131)	1.18	MODEL HAS NOT REACHED CENTERLINE						
S 5950(131)	1.18	MODEL HAS NOT REACHED CENTERLINE						
M 0000(131)	2.25	MODEL HAS NOT REACHED CENTERLINE						
T 2140(131)	2.28	MODEL HAS NOT REACHED CENTERLINE						
S 5970(131)	2.28	MODEL HAS NOT REACHED CENTERLINE						
INJECT TIME	2.40							
M 0002(131)	3.35	DATA NOT YET VALID						
T 2101(131)	3.28	DATA NOT YET VALID						
S 5971(131)	3.28	DATA NOT YET VALID						
T 2142(131)	4.46	1.540E-03	-0.322	1.015E-03	0.390	1.025E-03	1.025E-03	0.371
S 5972(131)	4.46	1.540E-03	-0.322	1.015E-03	0.390	1.025E-03	1.025E-03	0.371
T 2103(131)	4.46	1.540E-03	-0.322	1.015E-03	0.390	1.025E-03	1.025E-03	0.371
S 5973(131)	5.56	1.335E-03	-0.276	1.045E-03	0.375	1.068E-03	1.068E-03	0.319
T 2104(131)	5.56	1.335E-03	-0.276	1.045E-03	0.375	1.068E-03	1.068E-03	0.319
S 5974(131)	6.03	1.212E-03	-0.247	1.464E-03	0.299	1.394E-03	1.394E-03	0.285
T 2105(131)	6.03	1.212E-03	-0.247	1.464E-03	0.299	1.394E-03	1.394E-03	0.285
S 5975(131)	6.03	1.212E-03	-0.247	1.464E-03	0.299	1.394E-03	1.394E-03	0.285
T 2106(131)	7.73	1.102E-03	-0.224	1.334E-03	0.272	1.273E-03	1.273E-03	0.259
S 5976(131)	7.73	1.102E-03	-0.224	1.334E-03	0.272	1.273E-03	1.273E-03	0.259
T 2107(131)	7.76	1.102E-03	-0.224	1.334E-03	0.272	1.273E-03	1.273E-03	0.259
S 5977(131)	7.76	1.102E-03	-0.224	1.334E-03	0.272	1.273E-03	1.273E-03	0.259
T 2108(131)	8.06	1.014E-03	-0.207	1.233E-03	0.251	1.175E-03	1.175E-03	0.239
S 5978(131)	8.06	1.014E-03	-0.207	1.233E-03	0.251	1.175E-03	1.175E-03	0.239
T 2109(131)	8.06	1.014E-03	-0.207	1.233E-03	0.251	1.175E-03	1.175E-03	0.239
S 5979(131)	9.54	0.504E-04	-0.193	1.152E-03	0.234	1.047E-03	1.047E-03	0.223
T 2110(131)	9.54	0.504E-04	-0.193	1.152E-03	0.234	1.047E-03	1.047E-03	0.223
S 5980(131)	9.54	0.504E-04	-0.193	1.152E-03	0.234	1.047E-03	1.047E-03	0.223

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7/11/73

**WASA-HI ORRYER HEATING**

66299

AEDC (Aero. Inc.) Arnold AFB, Tennessee  
Von Karman Gas Dynamics Facility  
50 inch Hypersonic Tunnel A

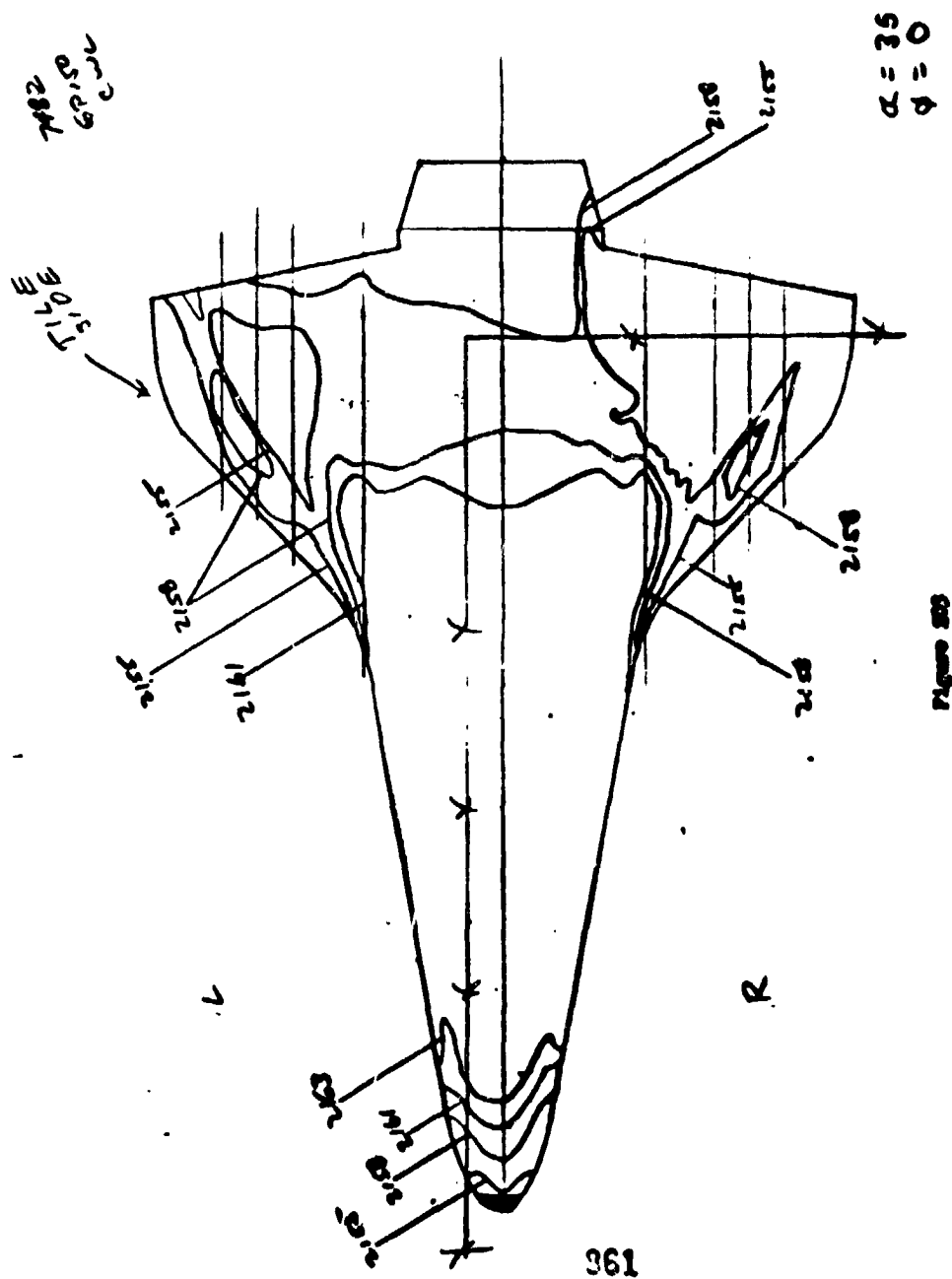
CONFID	MODEL	MACH NO	PO(PSIA)	T(DEG R)	ALPHA-MODEL	ALPHA-SECTION	ALPHA-PREBEND	ROLL-MODEL	YAW
149	URBTFM S	9.00	860.3	1354	25.04	-5.04	-30.00	-180.00	-0.00

T-1AF	P-1NF	Q-1NF	Ø-1NF	QMO-1NF	WU-1NF	Q4/FT	WREF	STREF
IDEQ W)	IPSAI)	(PSIA)	(F1/SEC)	(SLUGS/FT3)	(LH-SEC/FT2)	(F1-1)	(R= .0175F1)	(R= .0175F1)
94.1	.009	3.94E	3887	7.6535F-05	7.500F-0A	3.703E	06	4.019E-02

WAVELENGTH	FULL NO	PAINT TEMP (DEG F)	INITIAL TEMP (DEG F)	SQUARE ROOT (RHOXCKK)	TRAR(TO)	BETA(TO)
TOP(T)	7484					
BOT(B)	8537	131	81	0.086	6.150E-02	5.7306E-02

PIC NO	TYPE	DELTIME	M1(T0)	M(T0)/MREF	M(,Q10)	M(,QTO)/MREF	M(,923TO)	H1	M(,923TO)/MREF	ST(ITO)
1	214(131)	11.04	A-9.8E-14	.0182	1.084E-03	.0221	1.033E-03	.0210	3.809E-04	3.809E-04
2	215(131)	11.04	A-9.8E-14	.0182	1.084E-03	.0221	1.033E-03	.0210	3.809E-04	3.809E-04
3	216(131)	11.04	A-9.8E-14	.0182	1.084E-03	.0221	1.033E-03	.0210	3.809E-04	3.809E-04
4	217(131)	12.14	A-4.79E-14	.0172	1.027E-03	.0209	9.791E-04	.0199	3.605E-04	3.605E-04
5	218(131)	12.14	A-4.79E-14	.0172	1.027E-03	.0209	9.791E-04	.0199	3.605E-04	3.605E-04
6	219(131)	12.14	A-4.79E-14	.0172	1.027E-03	.0209	9.791E-04	.0199	3.605E-04	3.605E-04
7	220(131)	12.14	A-4.79E-14	.0172	1.027E-03	.0209	9.791E-04	.0199	3.605E-04	3.605E-04
8	221(131)	13.22	A-0.5E-14	.0165	9.794E-04	.0199	9.326E-04	.0190	3.438E-04	3.438E-04
9	222(131)	13.22	A-0.7E-14	.0164	9.794E-04	.0199	9.326E-04	.0190	3.438E-04	3.438E-04
10	223(131)	13.22	A-0.7E-14	.0164	9.794E-04	.0199	9.326E-04	.0190	3.438E-04	3.438E-04
11	224(131)	13.22	A-0.7E-14	.0164	9.794E-04	.0199	9.326E-04	.0190	3.438E-04	3.438E-04
12	225(131)	14.32	A-7.74E-14	.0157	9.371E-04	.0191	8.931E-04	.0182	3.289E-04	3.289E-04
13	226(131)	14.32	A-7.74E-14	.0157	9.371E-04	.0191	8.931E-04	.0182	3.289E-04	3.289E-04
14	227(131)	14.32	A-7.74E-14	.0157	9.371E-04	.0191	8.931E-04	.0182	3.289E-04	3.289E-04
15	228(131)	14.32	A-7.74E-14	.0157	9.371E-04	.0191	8.931E-04	.0182	3.289E-04	3.289E-04
16	229(131)	14.32	A-7.74E-14	.0157	9.371E-04	.0191	8.931E-04	.0182	3.289E-04	3.289E-04
17	230(131)	14.32	A-7.74E-14	.0157	9.371E-04	.0191	8.931E-04	.0182	3.289E-04	3.289E-04
18	231(131)	14.32	A-7.74E-14	.0157	9.371E-04	.0191	8.931E-04	.0182	3.289E-04	3.289E-04
19	232(131)	14.32	A-7.74E-14	.0157	9.371E-04	.0191	8.931E-04	.0182	3.289E-04	3.289E-04
20	233(131)	14.32	A-7.74E-14	.0157	9.371E-04	.0191	8.931E-04	.0182	3.289E-04	3.289E-04
21	234(131)	14.32	A-7.74E-14	.0157	9.371E-04	.0191	8.931E-04	.0182	3.289E-04	3.289E-04
22	235(131)	14.32	A-7.74E-14	.0157	9.371E-04	.0191	8.931E-04	.0182	3.289E-04	3.289E-04
23	236(131)	14.32	A-7.74E-14	.0157	9.371E-04	.0191	8.931E-04	.0182	3.289E-04	3.289E-04
24	237(131)	14.32	A-7.74E-14	.0157	9.371E-04	.0191	8.931E-04	.0182	3.289E-04	3.289E-04
25	238(131)	14.32	A-7.74E-14	.0157	9.371E-04	.0191	8.931E-04	.0182	3.289E-04	3.289E-04
26	239(131)	14.32	A-7.74E-14	.0157	9.371E-04	.0191	8.931E-04	.0182	3.289E-04	3.289E-04
27	240(131)	14.32	A-7.74E-14	.0157	9.371E-04	.0191	8.931E-04	.0182	3.289E-04	3.289E-04
28	241(131)	14.32	A-7.74E-14	.0157	9.371E-04	.0191	8.931E-04	.0182	3.289E-04	3.289E-04
29	242(131)	14.32	A-7.74E-14	.0157	9.371E-04	.0191	8.931E-04	.0182	3.289E-04	3.289E-04
30	243(131)	14.32	A-7.74E-14	.0157	9.371E-04	.0191	8.931E-04	.0182	3.289E-04	3.289E-04
31	244(131)	14.32								

544



AECH (AHO, INC.) ARNOLD AFS, TENNESSEE  
VON KARMAN GAS DYNAMICS FACILITY  
50 INCH HYPERSONIC TUNNEL A

PTC NO	TIME	REL TIME	WCTO)	HCTO)/HREF	WCTO)	WCTO)/HREF	WCTO)/HREF	ST(10)
M	2073(1350)	1-15	MODEL HAS NOT REACHED CENTERLINE					
T	2152(1350)	1-18	MODEL HAS NOT REACHED CENTERLINE					
M	5942(1350)	1-18	MODEL HAS NOT REACHED CENTERLINE					
T	2153(1350)	2-25	MODEL HAS NOT REACHED CENTERLINE					
M	4074(1350)	2-25	MODEL HAS NOT REACHED CENTERLINE					
T	5943(1350)	2-28	MODEL HAS NOT REACHED CENTERLINE					
INJECT TIME = 2.67								
T	2154(1350)	3-25	DATA NOT YET VALID					
M	4075(1350)	3-25	DATA NOT YET VALID					
T	5944(1350)	3-28	DATA NOT YET VALID					
T	2154(1350)	4-44	1-2025-02	2566	1-5345-02	3345	1-5345-02	3124
M	4075(1350)	4-44	1-2025-02	2566	1-5345-02	3345	1-5345-02	3124
T	2154(1350)	5-22	1-2025-02	2205	1-5345-02	3345	1-5345-02	3124
M	5944(1350)	5-22	1-2025-02	2205	1-5345-02	3345	1-5345-02	3124
T	2154(1350)	5-26	1-2025-02	2205	1-5345-02	3345	1-5345-02	3124
M	4075(1350)	5-26	1-2025-02	2205	1-5345-02	3345	1-5345-02	3124
T	2154(1350)	5-26	1-2025-02	2205	1-5345-02	3345	1-5345-02	3124
M	5944(1350)	5-26	1-2025-02	2205	1-5345-02	3345	1-5345-02	3124
T	2154(1350)	5-26	1-2025-02	2205	1-5345-02	3345	1-5345-02	3124
M	4075(1350)	5-26	1-2025-02	2205	1-5345-02	3345	1-5345-02	3124
T	2154(1350)	5-26	1-2025-02	2205	1-5345-02	3345	1-5345-02	3124
M	5944(1350)	5-26	1-2025-02	2205	1-5345-02	3345	1-5345-02	3124
T	2154(1350)	5-26	1-2025-02	2205	1-5345-02	3345	1-5345-02	3124
M	4075(1350)	5-26	1-2025-02	2205	1-5345-02	3345	1-5345-02	3124
T	2154(1350)	5-26	1-2025-02	2205	1-5345-02	3345	1-5345-02	3124
M	5944(1350)	5-26	1-2025-02	2205	1-5345-02	3345	1-5345-02	3124
T	2154(1350)	5-26	1-2025-02	2205	1-5345-02	3345	1-5345-02	3124
M	4075(1350)	5-26	1-2025-02	2205	1-5345-02	3345	1-5345-02	3124
T	2154(1350)	5-26	1-2025-02	2205	1-5345-02	3345	1-5345-02	3124
M	5944(1350)	5-26	1-2025-02	2205	1-5345-02	3345	1-5345-02	3124
T	2154(1350)	5-26	1-2025-02	2205	1-5345-02	3345	1-5345-02	3124
M	4075(1350)	5-26	1-2025-02	2205	1-5345-02	3345	1-5345-02	3124
T	2154(1350)	5-26	1-2025-02	2205	1-5345-02	3345	1-5345-02	3124
M	5944(1350)	5-26	1-2025-02	2205	1-5345-02	3345	1-5345-02	3124
T	2154(1350)	5-26	1-2025-02	2205	1-5345-02	3345	1-5345-02	3124
M	4075(1350)	5-26	1-2025-02	2205	1-5345-02	3345	1-5345-02	3124
T	2154(1350)	5-26	1-2025-02	2205	1-5345-02	3345	1-5345-02	3124
M	5944(1350)	5-26	1-2025-02	2205	1-5345-02	3345	1-5345-02	3124
T	2154(1350)	5-26	1-2025-02	2205	1-5345-02	3345	1-5345-02	3124
M	4075(1350)	5-26	1-2025-02	2205	1-5345-02	3345	1-5345-02	3124
T	2154(1350)	5-26	1-2025-02	2205	1-5345-02	3345	1-5345-02	3124
M	5944(1350)	5-26	1-2025-02	2205	1-5345-02	3345	1-5345-02	3124
T	2154(135							

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 7/11/73

NASA-HI ORBITER PEATING AEDC(IAM-INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL A  
 VA245

GROUP CONFID MODEL MACH NO PO(PSIA) TO(DEC R) ALPHA-MODEL ALPHA-SECTION ALPHA-PREBEND ROLL-MODEL YAW  
 14 4 04E17F R1 4.00 461.9 1354 35.04 -5.04 -30.00 -180.20 -0.00  
 T-1NF P-1NF Q-1NF V-1NF QMO-1NF QU-1NF RF/FT HREF STREF  
 (DEG R) (PSIAL) (PSIAL) (FT/SEC) (LBS-SEC/FT2) (FT-1) (RE-0.175F1) (MM-0.175F1)  
 9A.1 0.00 3.955 3083 7.550E-04 7.898E-04 2.711E 04 4.910E-02 2.107E-02  
 CAUCHA ROLL NO PAINT IFMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (MMORCAK) TRANSITION BETA(10)  
 10P(1) 384  
 51P(15) 8537  
 40TCH(18) 7534

PIC NO TIME DELTIVE M(TO) M(TO)/MREF M(-QTO) M(-QTO)/MREF M(-QTO)/MREF M(-Q23TO) M(-Q23TO)/MREF ST(10)  
 T 2161(150) 11.04 9.69 7.145F-03 7.145F-03 7.145F-03 7.145F-03 7.145F-03 7.145F-03 7.145F-03 7.145F-03 7.145F-03  
 S 5991(150) 11.04 9.69 7.145F-03 7.145F-03 7.145F-03 7.145F-03 7.145F-03 7.145F-03 7.145F-03 7.145F-03 7.145F-03  
 M 2052(150) 11.04 9.69 7.145F-03 7.145F-03 7.145F-03 7.145F-03 7.145F-03 7.145F-03 7.145F-03 7.145F-03 7.145F-03  
 W 2053(150) 12.11 10.77 4.778F-03 4.778F-03 4.778F-03 4.778F-03 4.778F-03 4.778F-03 4.778F-03 4.778F-03 4.778F-03  
 T 2162(150) 12.14 10.79 4.778F-03 4.778F-03 4.778F-03 4.778F-03 4.778F-03 4.778F-03 4.778F-03 4.778F-03 4.778F-03  
 S 5992(150) 12.14 10.79 4.778F-03 4.778F-03 4.778F-03 4.778F-03 4.778F-03 4.778F-03 4.778F-03 4.778F-03 4.778F-03  
 M 2054(150) 13.22 11.87 6.456F-03 6.456F-03 6.456F-03 6.456F-03 6.456F-03 6.456F-03 6.456F-03 6.456F-03 6.456F-03  
 T 2163(150) 13.22 11.87 6.456F-03 6.456F-03 6.456F-03 6.456F-03 6.456F-03 6.456F-03 6.456F-03 6.456F-03 6.456F-03  
 S 5993(150) 13.22 11.87 6.456F-03 6.456F-03 6.456F-03 6.456F-03 6.456F-03 6.456F-03 6.456F-03 6.456F-03 6.456F-03  
 M 2055(150) 13.22 11.87 6.456F-03 6.456F-03 6.456F-03 6.456F-03 6.456F-03 6.456F-03 6.456F-03 6.456F-03 6.456F-03  
 T 2164(150) 14.32 12.97 4.176F-03 4.176F-03 4.176F-03 4.176F-03 4.176F-03 4.176F-03 4.176F-03 4.176F-03 4.176F-03  
 S 5994(150) 14.32 12.97 4.176F-03 4.176F-03 4.176F-03 4.176F-03 4.176F-03 4.176F-03 4.176F-03 4.176F-03 4.176F-03  
 M 2056(150) 14.32 12.97 4.176F-03 4.176F-03 4.176F-03 4.176F-03 4.176F-03 4.176F-03 4.176F-03 4.176F-03 4.176F-03  
 MODEL HAS LEFT CENTERLINE  
 T 2165(150) 14.32 12.97 4.176F-03 4.176F-03 4.176F-03 4.176F-03 4.176F-03 4.176F-03 4.176F-03 4.176F-03 4.176F-03  
 S 5995(150) 14.32 12.97 4.176F-03 4.176F-03 4.176F-03 4.176F-03 4.176F-03 4.176F-03 4.176F-03 4.176F-03 4.176F-03  
 M 2057(150) 14.32 12.97 4.176F-03 4.176F-03 4.176F-03 4.176F-03 4.176F-03 4.176F-03 4.176F-03 4.176F-03 4.176F-03  
 T 2166(150) 15.42 14.07 5.929F-03 5.929F-03 5.929F-03 5.929F-03 5.929F-03 5.929F-03 5.929F-03 5.929F-03 5.929F-03  
 S 5996(150) 15.42 14.07 5.929F-03 5.929F-03 5.929F-03 5.929F-03 5.929F-03 5.929F-03 5.929F-03 5.929F-03 5.929F-03  
 M 2058(150) 15.42 14.07 5.929F-03 5.929F-03 5.929F-03 5.929F-03 5.929F-03 5.929F-03 5.929F-03 5.929F-03 5.929F-03  
 T 2167(150) 16.49 15.15 6.715F-03 6.715F-03 6.715F-03 6.715F-03 6.715F-03 6.715F-03 6.715F-03 6.715F-03 6.715F-03  
 S 5997(150) 16.49 15.15 6.715F-03 6.715F-03 6.715F-03 6.715F-03 6.715F-03 6.715F-03 6.715F-03 6.715F-03 6.715F-03  
 M 2059(150) 16.49 15.15 6.715F-03 6.715F-03 6.715F-03 6.715F-03 6.715F-03 6.715F-03 6.715F-03 6.715F-03 6.715F-03  
 T 2168(150) 16.52 15.17 6.715F-03 6.715F-03 6.715F-03 6.715F-03 6.715F-03 6.715F-03 6.715F-03 6.715F-03 6.715F-03  
 S 5998(150) 16.52 15.17 6.715F-03 6.715F-03 6.715F-03 6.715F-03 6.715F-03 6.715F-03 6.715F-03 6.715F-03 6.715F-03  
 M 2060(150) 16.52 15.17 6.715F-03 6.715F-03 6.715F-03 6.715F-03 6.715F-03 6.715F-03 6.715F-03 6.715F-03 6.715F-03





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7/11/73

AFDC(AND-INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL R

NASA-WI COMPUTER PRINTING

VA269

GROUP CONFIG MODEL MACH NO PO(PSIA) TO(CEG R) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREPEND ROLL-MODEL YAW  
 1C1 2 CREITER S 4.00 860.6 1354 35.02 -5.04 -30.00 -181.80 1.03  
 T-INF P-INF Q-INF W-INF RMO-INF MU-INF HE/FT HUEFF STREF  
 (CEG W) (PSIA) (FT/SEC) (LUGS/FT) (LUGS/FT) (FT-1) (RZ .0175FI) (RZ .0175FI)  
 9M1 .006 3.969 1865 7.576E-05 7.501E-05 3.704E 06 4.914E-02 2.109E-02

CAMERA ROLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHOXCKX) TBAR(10) BETA(10)  
 TOP(1) 8214  
 SIDE(S) 7212  
 BOTTOM(B) 8527  
 150 81 .0496 0 0

PIC NO TIME DELTIME HITO) HITOI/MREF H(10T) M(10T) MREF ST(10)  
 T 2194(150) 1.15 MODEL HAS NOT REACHED CENTERLINE  
 M 2114(150) 1.15 MODEL HAS NOT REACHED CENTERLINE  
 S 2124(150) 1.18 MODEL HAS NOT REACHED CENTERLINE  
 W 2114(150) 2.23 MODEL HAS NOT REACHED CENTERLINE  
 T 2194(150) 2.25 MODEL HAS NOT REACHED CENTERLINE  
 S 2124(150) 2.25 MODEL HAS NOT REACHED CENTERLINE

INJECT TIME = 2.60

DATA NOT YET VALID

DATA NOT YET VALID

547

T	2194(150)	3.03	2.274E-03	.0569	2.661E-03	.0541	9.750E-04
M	2114(150)	3.04	2.274E-03	.0546	2.650E-03	.0539	9.710E-04
S	2124(150)	3.04	2.274E-03	.0545	2.650E-03	.0539	9.710E-04
W	2114(150)	4.11	1.972E-03	.0488	2.286E-03	.0445	8.374E-04
T	2194(150)	4.13	1.965E-03	.0487	2.274E-03	.0444	8.350E-04
S	2124(150)	4.14	1.966E-03	.0487	2.274E-03	.0444	8.350E-04
M	2114(150)	5.10	1.774E-03	.0475	2.035E-03	.0414	7.456E-04
T	2194(150)	5.21	1.772E-03	.0474	2.030E-03	.0413	7.439E-04
S	2124(150)	5.21	1.772E-03	.0474	2.030E-03	.0413	7.439E-04
M	2114(150)	6.24	1.574E-03	.0396	1.852E-03	.0377	6.782E-04
T	2194(150)	6.28	1.575E-03	.0395	1.849E-03	.0376	6.769E-04
S	2124(150)	6.28	1.575E-03	.0395	1.849E-03	.0376	6.769E-04
M	2114(150)	7.34	1.476E-03	.0365	1.711E-03	.0348	6.266E-04
T	2194(150)	7.34	1.473E-03	.0365	1.704E-03	.0347	6.250E-04
S	2124(150)	7.35	1.473E-03	.0365	1.704E-03	.0347	6.250E-04
M	2114(150)	8.49	1.372E-03	.0340	1.590E-03	.0323	5.826E-04
T	2194(150)	8.49	1.372E-03	.0340	1.590E-03	.0323	5.826E-04
S	2124(150)	8.49	1.372E-03	.0340	1.590E-03	.0323	5.826E-04

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7/11/73

NASA-R1 ORBITER HEATING

VA289

AFOC(APO, INC.) ARNOLD AFS, TENNESSEE  
VON KARMAN GAS DYNAMICS FACILITY  
50 INCH HYPERSONIC TUNNEL A

GROUP CONFIG MODEL MACH NO PO(PSIA) TO(DEG R) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREBEND ROLL-MODEL YAW  
152 5 ORBITER R2 8.00 860.1 1357 35.04 -5.04 -30.00 -180.00 --0.00

T-INF P-INF Q-INF V-INF RMO-INF MU-INF HF/FT HREF SINEF  
(DEG R) (PSIA) (FT/SEC) (SLUGS/FT3) (LB-SEC/FT3) (FT-I) (R= -0175FI) (R= -0175FI)  
98.3 .088 3.947 3887 7.517E-05 7.917E-08 3.691E 06 4.916E-02 2.112E-02

CASPERA HOLL MU PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHOXCAK) TRAR(ITO) BETAITO)  
TOP(IT) 8219  
SIFP(S) 7212  
MOTTCM(B) 8527

PIC NO TIME DELTIME H(ITO) H(ITO)/HREF H(.910) H(.910)/HREF H(.923TO) H(.923TO)/HREF ST(ITO)

T 221P(400)	10.51	9.56	9.233E-03	1.234E-02	.2515	1.145E-02	.2330	3.875E-03
M 913V(400)	10.51	9.56	9.233E-03	1.234E-02	.2515	1.145E-02	.2330	3.875E-03
S 604E(400)	10.54	9.59	9.221E-03	1.235E-02	.2517	1.144E-02	.2327	3.870E-03
M 214V(400)	11.59	10.64	8.754E-03	1.172E-02	.2385	1.085E-02	.2210	3.676E-03
T 221V(400)	12.01	10.64	8.744E-03	1.171E-02	.2382	1.085E-02	.2207	3.673E-03
S 604V(400)	12.01	10.64	8.744E-03	1.171E-02	.2382	1.085E-02	.2207	3.673E-03
T 222V(400)	13.09	11.74	8.333E-03	1.116E-02	.2269	1.034E-02	.2103	3.497E-03
S 605V(400)	13.09	11.74	8.333E-03	1.116E-02	.2269	1.034E-02	.2103	3.497E-03
M 214V(400)	13.09	11.74	8.333E-03	1.116E-02	.2265	1.034E-02	.2103	3.497E-03
T 222V(400)	14.17	12.82	7.976E-03	1.068E-02	.2172	9.894E-03	.2012	3.347E-03
S 605V(400)	14.17	12.82	7.976E-03	1.068E-02	.2172	9.894E-03	.2012	3.347E-03
T 222V(400)	14.17	12.82	7.976E-03	1.068E-02	.2172	9.894E-03	.2012	3.347E-03
M 214V(400)	15.24	13.89	7.651E-03	1.026E-02	.2086	9.503E-03	.1933	3.214E-03
S 605V(400)	15.24	13.89	7.651E-03	1.026E-02	.2086	9.503E-03	.1933	3.214E-03
T 222V(400)	16.32	14.97	7.340E-03	9.873E-03	.2010	9.155E-03	.1862	3.097E-03
S 605V(400)	16.32	14.97	7.340E-03	9.873E-03	.2010	9.155E-03	.1862	3.097E-03
T 222V(400)	16.32	14.97	7.340E-03	9.873E-03	.2010	9.155E-03	.1862	3.097E-03
S 605V(400)	16.32	14.97	7.340E-03	9.873E-03	.2010	9.155E-03	.1862	3.097E-03

MODEL HAS LEFT CENTERLINE



Group 153  
8527  
nd

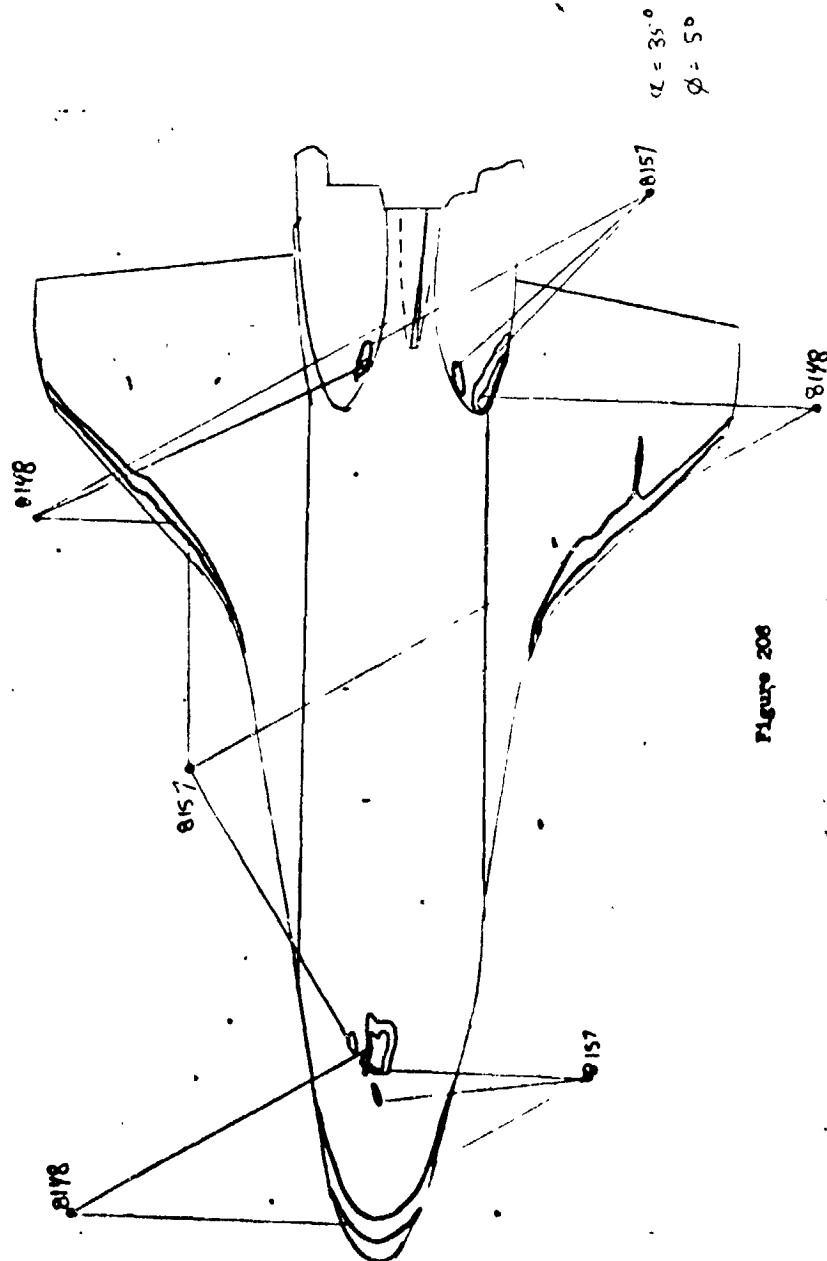


Figure 208

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 7/11/73

NASA-R1 ORBITER HEATING AFDC(AW-1AC-1) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL R

VA249

GROUP CNFTG MODEL MACH NO M(PISA) TOIDEN P) ALPHA-MODEL ALPHA-SECTION ALPHA-PREBEND ROLL-MODEL YAW  
 153 2 ORBITER 5 4.00 860.9 1350 35.03 -5.35 -30.00 -188.70 5.02  
 T-1AF P-1AF G-1AF V-1AF RHO-1AF MU-1AF RF/FT MREF STREF  
 (DEG R) (PSIA) (PSIA) (FT/SEC) (SLUGS/FT<sup>3</sup>) (LH-SEC/FT<sup>2</sup>) (FT-1) (RZ .0175FI) (INZ .0175FI)  
 94.0 308 3.950 3890 7.514E-05 7.520E-05 3.487E 06 4.919E-02 2.112E-02  
 CAMERA ROLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHO/CAK) TRAR(TO) BETA(TO)  
 TOP(T) 821A  
 STIFF(S) 7212  
 MOTTC(B) 8527

PIC NO TIME DELTAE H(TO) M(TO)/MREF M(.9TO) MREF M(.9TO) M(.923TO) MREF ST(TO)  
 T 2224(150) 1.15 MODEL HAS NOT REACHED CENTERLINE M(TO)/MREF M(.9TO) MREF M(.9TO) MREF ST(TO)  
 M 2155(150) 1.15 MODEL HAS NOT REACHED CENTERLINE  
 S 6054(150) 1.18 MODEL HAS NOT REACHED CENTERLINE  
 T 2225(150) 2.25 MODEL HAS NOT REACHED CENTERLINE  
 S 6055(150) 2.25 MODEL HAS NOT REACHED CENTERLINE  
 M 2156(150) 2.25 MODEL HAS NOT REACHED CENTERLINE  
 INJECT TIME = 2.39  
 T 2224(150) 3.23 DATA NOT YET VALID  
 M 2155(150) 3.23 DATA NOT YET VALID  
 S 6054(150) 3.25 DATA NOT YET VALID  
 T 2225(150) 4.41 3.07 2.31E-03 .0464 2.800E-03 .0569 2.605E-03 .0542 9.701E-04  
 M 2156(150) 4.43 3.10 2.24E-03 .0466 2.798E-03 .0567 2.655E-03 .0540 9.744E-04  
 S 6057(150) 4.43 3.10 2.24E-03 .0466 2.798E-03 .0567 2.655E-03 .0540 9.744E-04  
 T 2226(150) 5.44 4.14 1.90E-03 .0402 2.444E-03 .0400 2.293E-03 .0466 8.418E-04  
 M 2157(150) 5.51 4.17 1.974E-03 .0401 2.402E-03 .0400 2.287E-03 .0465 8.391E-04  
 S 6058(150) 5.51 4.17 1.974E-03 .0401 2.402E-03 .0400 2.287E-03 .0465 8.391E-04  
 T 2227(150) 6.58 5.24 1.700E-03 .0359 2.111E-03 .0435 2.039E-03 .0414 7.482E-04  
 M 2158(150) 6.58 5.24 1.700E-03 .0359 2.111E-03 .0435 2.039E-03 .0414 7.482E-04  
 S 6059(150) 6.58 5.24 1.700E-03 .0359 2.111E-03 .0435 2.039E-03 .0414 7.482E-04  
 T 2228(150) 7.66 6.32 1.603E-03 .0326 1.951E-03 .0396 1.857E-03 .0377 6.814E-04  
 M 2159(150) 7.66 6.32 1.603E-03 .0326 1.951E-03 .0396 1.857E-03 .0377 6.814E-04  
 S 6060(150) 7.66 6.32 1.603E-03 .0326 1.951E-03 .0396 1.857E-03 .0377 6.814E-04  
 T 2229(150) 8.74 7.44 1.42E-03 .0301 1.831E-03 .0367 1.717E-03 .0349 6.299E-04  
 M 2160(150) 8.74 7.44 1.42E-03 .0301 1.831E-03 .0367 1.717E-03 .0349 6.299E-04  
 S 6061(150) 8.74 7.44 1.42E-03 .0301 1.831E-03 .0367 1.717E-03 .0349 6.299E-04  
 T 2230(150) 9.81 8.60 1.35E-03 .0281 1.65E-03 .0342 1.604E-03 .0326 5.866E-04

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7/11/73

NASA-HI ORBITER PEATING

VA229

AEDC(AHO-INC.) ARNOLD AFS, TENNESSEE  
VON KARMAN GAS DYNAMICS FACILITY  
50 INCH HYPERSONIC TUNNEL A

GROUP COMPTC MODEL MACH NO PO (PSIA) TO (DEG R) ALPHA-MODEL ALPHA-SECTION ALPHA-PREBEND ROLL-MODEL YAW  
1 1 2 ORBITER S 8.00 861.3 1354 35.03 -5.35 -30.00 -188.70 5.02

T-TAF P-IMP Q-IMP V-IMP RHO-IMP MU-IMP W-IMP HREF STREF  
(DEG W) (PSIA) (PSIA) (FT/SEC) (SLUGS/FT3) (LB-S/C/FT2) (FT-L) (HREF) (HREF) (HREF) (HREF)  
9.5 0.08 1.952 38.9 7.517E-05 7.927E-08 3.489E 06 4.920E-02 2.112E-02

CAMERA ROLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHOCAR) TRAR(TO) BETA(TO)  
104(T) 8218  
SIDE(S) 7212  
BOTTOM(B) 8527

8.550E-02 8.1282E-02

PIC NO TIME DELTIME M(TO) M(10) M(20)/HREF M(30) M(40)/HREF M(50)/HREF ST(TO)  
T 2232(150) 4.54 2.51 1.343E-03 1.483E-03 1.602E-03 1.602E-03 1.602E-03 5.877E-04  
S 4002(150) 4.54 2.51 1.343E-03 1.483E-03 1.602E-03 1.602E-03 1.602E-03 5.877E-04  
T 2233(150) 10.51 9.52 1.343E-03 1.483E-03 1.602E-03 1.602E-03 1.602E-03 5.877E-04  
S 4003(150) 10.51 9.52 1.343E-03 1.483E-03 1.602E-03 1.602E-03 1.602E-03 5.877E-04  
M 152(152) 10.51 9.52 1.343E-03 1.483E-03 1.602E-03 1.602E-03 1.602E-03 5.877E-04  
T 2234(150) 11.59 1.66 1.343E-03 1.483E-03 1.602E-03 1.602E-03 1.602E-03 5.877E-04  
S 4004(150) 11.59 1.66 1.343E-03 1.483E-03 1.602E-03 1.602E-03 1.602E-03 5.877E-04  
M 9155(150) 11.59 1.66 1.343E-03 1.483E-03 1.602E-03 1.602E-03 1.602E-03 5.877E-04  
T 2235(150) 12.57 11.72 1.343E-03 1.483E-03 1.602E-03 1.602E-03 1.602E-03 5.877E-04  
S 4005(150) 12.57 11.72 1.343E-03 1.483E-03 1.602E-03 1.602E-03 1.602E-03 5.877E-04  
M 4157(150) 13.09 11.74 1.343E-03 1.483E-03 1.602E-03 1.602E-03 1.602E-03 5.877E-04  
T 2236(150) 14.14 12.41 1.343E-03 1.483E-03 1.602E-03 1.602E-03 1.602E-03 5.877E-04  
S 4006(150) 14.14 12.41 1.343E-03 1.483E-03 1.602E-03 1.602E-03 1.602E-03 5.877E-04  
M 4158(150) 14.17 12.42 1.343E-03 1.483E-03 1.602E-03 1.602E-03 1.602E-03 5.877E-04  
T 2237(150) 14.52 14.92 1.343E-03 1.483E-03 1.602E-03 1.602E-03 1.602E-03 5.877E-04  
S 4007(150) 14.52 14.92 1.343E-03 1.483E-03 1.602E-03 1.602E-03 1.602E-03 5.877E-04  
M 4159(150) 14.54 14.93 1.343E-03 1.483E-03 1.602E-03 1.602E-03 1.602E-03 5.877E-04  
T 2238(150) 15.24 14.94 1.343E-03 1.483E-03 1.602E-03 1.602E-03 1.602E-03 5.877E-04  
S 4008(150) 15.24 14.94 1.343E-03 1.483E-03 1.602E-03 1.602E-03 1.602E-03 5.877E-04  
M 4160(150) 15.26 14.94 1.343E-03 1.483E-03 1.602E-03 1.602E-03 1.602E-03 5.877E-04  
T 2239(150) 16.32 14.94 1.343E-03 1.483E-03 1.602E-03 1.602E-03 1.602E-03 5.877E-04  
S 4009(150) 16.32 14.94 1.343E-03 1.483E-03 1.602E-03 1.602E-03 1.602E-03 5.877E-04  
M 4161(150) 16.34 14.94 1.343E-03 1.483E-03 1.602E-03 1.602E-03 1.602E-03 5.877E-04





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**.375**

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7/11/77

# NASA-R1 ORRITER HEATING

AEDICARO, INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL R

VA289

GROUP	CONFID	MODEL	MACH NO	PR(PSTIA)	TO(DEC R)	ALPHA-MODEL	ALPHA-SECTOR	ALPHA-PREBEND	ROLL-MODEL	YAW
154	2	ORRITER S	8.00	860.2	1361	30.05	-0.05	-30.00	-180.00	-0.00
T-1NF	Q-1NF	Q-1NF	Q-1NF	Q-1NF	Q-1NF	Q-1NF	Q-1NF	Q-1NF	Q-1NF	Q-1NF
DEC R	(PSTIA)	(PSTIA)	(PSTIA)	(PSTIA)	(PSTIA)	(PSTIA)	(PSTIA)	(PSTIA)	(PSTIA)	(PSTIA)
98.6	0.08	3.947	30.0	7.496E-05	7.939E-19	3.675E 06	4.918E-02	2.115E-02		
CAMERA	ROLL NO	PAINT	TEMP (DEG F)	INITIAL TEMP (DEG F)	SQUARE ROOT (RHOXCAK)	TRAR(TO)	BETA(TO)			
TOP(T)	8219									
SIDE(S)	7212		300	R2						
MOTTON(R)	8527									

PIC NO	TIME	DELTIME	H(TO)	H(TO)/HREF	M( 910)	M( 910)/HREF	M( 913TO)	M( 913TO)/HREF	ST(TO)
T 2239(1300)	1.15								
M 2160(1300)	1.15								
S 6069(1300)	1.15								
T 2240(1300)	2.25								
S 6074(1300)	2.25								
M 2161(1300)	2.25								
INJECT TIME = 2.38									
T 2241(1300)	3.23								
M 2162(1300)	3.23								
S 6071(1300)	3.23								
T 2242(1300)	4.41	3.07	9.311E-03	1.150E-02	1.150E-02	1.151E-02	1.151E-02	1.151E-02	3.950E-03
S 6072(1300)	4.41	3.10	9.313E-03	1.146E-02	1.146E-02	1.146E-02	1.146E-02	1.146E-02	3.934E-03
M 2163(1300)	4.41	3.10	9.313E-03	1.146E-02	1.146E-02	1.146E-02	1.146E-02	1.146E-02	3.934E-03
T 2243(1300)	5.48	4.16	9.046E-03	1.074E-02	1.074E-02	1.074E-02	1.074E-02	1.074E-02	3.938E-03
S 6073(1300)	5.51	4.17	9.022E-03	1.071E-02	1.071E-02	1.071E-02	1.071E-02	1.071E-02	3.938E-03
M 2164(1300)	5.51	4.17	9.022E-03	1.071E-02	1.071E-02	1.071E-02	1.071E-02	1.071E-02	3.938E-03
T 2244(1300)	6.58	5.26	7.122E-03	1.071E-02	1.071E-02	1.071E-02	1.071E-02	1.071E-02	3.938E-03
S 6074(1300)	6.58	5.26	7.122E-03	1.071E-02	1.071E-02	1.071E-02	1.071E-02	1.071E-02	3.938E-03
M 2165(1300)	6.58	5.26	7.122E-03	1.071E-02	1.071E-02	1.071E-02	1.071E-02	1.071E-02	3.938E-03
T 2245(1300)	7.66	6.32	6.515E-03	1.071E-02	1.071E-02	1.071E-02	1.071E-02	1.071E-02	3.938E-03
S 6075(1300)	7.66	6.32	6.515E-03	1.071E-02	1.071E-02	1.071E-02	1.071E-02	1.071E-02	3.938E-03
M 2166(1300)	7.66	6.32	6.515E-03	1.071E-02	1.071E-02	1.071E-02	1.071E-02	1.071E-02	3.938E-03
T 2246(1300)	8.74	7.40	6.013E-03	1.071E-02	1.071E-02	1.071E-02	1.071E-02	1.071E-02	3.938E-03
S 6076(1300)	8.74	7.40	6.013E-03	1.071E-02	1.071E-02	1.071E-02	1.071E-02	1.071E-02	3.938E-03
M 2167(1300)	8.74	7.40	6.013E-03	1.071E-02	1.071E-02	1.071E-02	1.071E-02	1.071E-02	3.938E-03
T 2247(1300)	9.84	8.50	5.619E-03	1.071E-02	1.071E-02	1.071E-02	1.071E-02	1.071E-02	3.938E-03
S 6077(1300)	9.84	8.50	5.619E-03	1.071E-02	1.071E-02	1.071E-02	1.071E-02	1.071E-02	3.938E-03
M 2168(1300)	9.84	8.50	5.619E-03	1.071E-02	1.071E-02	1.071E-02	1.071E-02	1.071E-02	3.938E-03

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NASA-RI ORBITER PEATING AEDC(ARO, INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL R

VA289

GROUP CAMFIG MODEL MACH NO PO(PISA) TO(DEG R) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREBEND ROLL-MODEL YAW  
 154 2 CRITER S 4.00 460.4 1361 30.05 -0.05 -30.00 -180.00 -0.00

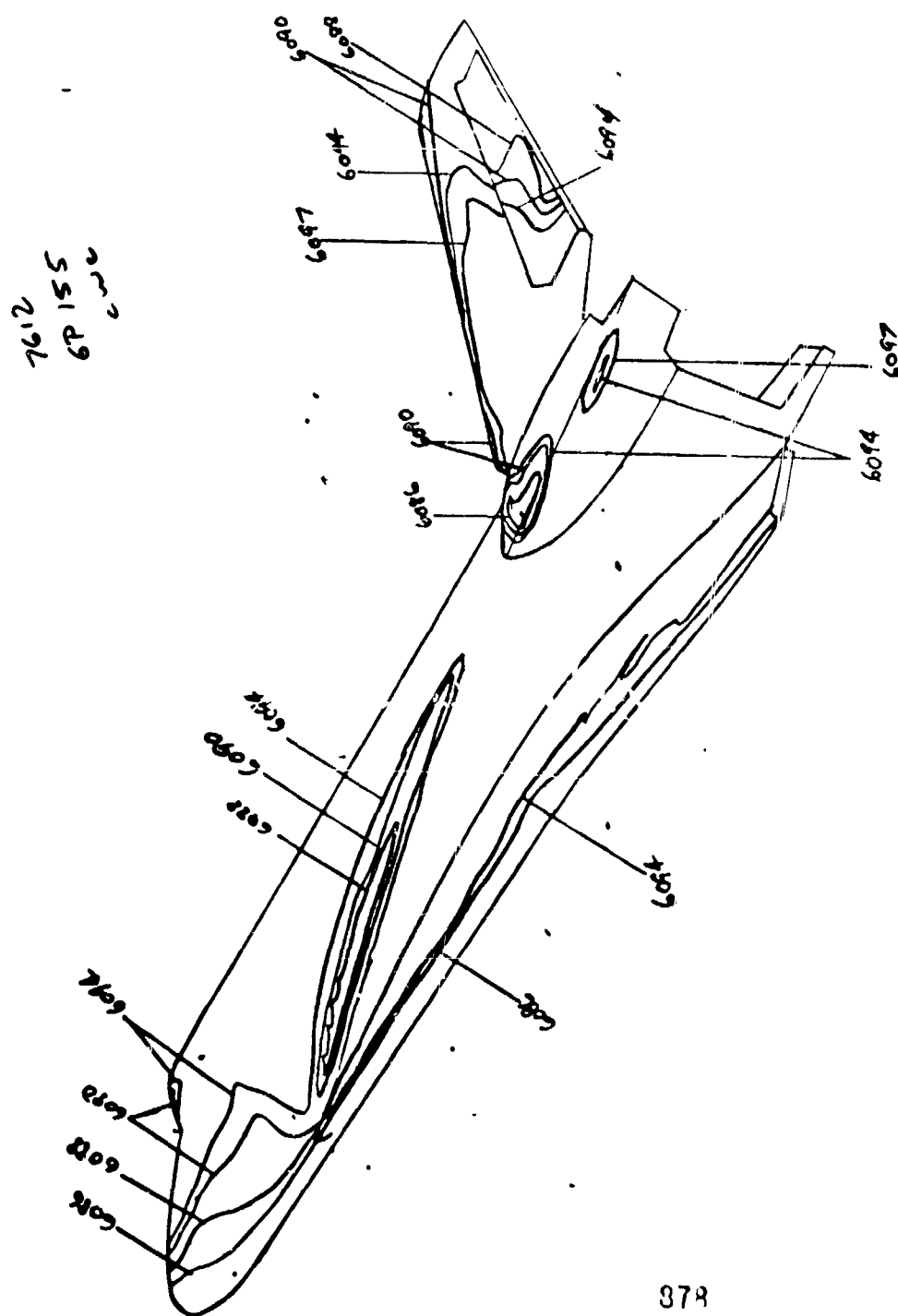
T-1NF C-1NF Q-1NF V-1NF MU-1NF HE/FT MREF STREF  
 (DEG R) (PSIA) (PSIA) (FT/SEC) (SLUGS/FT<sup>3</sup>) (LBS-SEC/FT<sup>2</sup>) (FT-1) (R/R -0.175FI) (R/R -0.175FI)  
 90.4 .088 3.948 3893 7.497E-05 7.940E-08 3.474E 06 4.919E-02 2.115E-02

CAMERA ROLL NO PAINT IFMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHOXCKK) TRAR(10) BETA(10)  
 TOP(1) 8218  
 SIDE(S) 7212  
 MOTION(R) 8527

PIC NO	TIME DELTME	H(10)	H(10)/MREF	H(10)	M(10)	M(10)/MREF	M(10)	M(10)/MREF	ST(10)
T 2248(100)	10.51	9.58	5.294E-03	5.294E-03	6.739E-03	6.739E-03	6.739E-03	6.739E-03	2.235E-03
S 4074(100)	10.51	9.58	5.294E-03	5.294E-03	6.739E-03	6.739E-03	6.739E-03	6.739E-03	2.235E-03
M 8159(100)	10.51	9.58	5.294E-03	5.294E-03	6.739E-03	6.739E-03	6.739E-03	6.739E-03	2.235E-03
T 2249(100)	11.59	10.65	5.020E-03	5.020E-03	6.390E-03	6.390E-03	6.390E-03	6.390E-03	2.119E-03
M 8170(100)	11.59	10.65	5.020E-03	5.020E-03	6.390E-03	6.390E-03	6.390E-03	6.390E-03	2.119E-03
S 4074(100)	12.01	13.08	5.014E-03	5.014E-03	6.390E-03	6.390E-03	6.390E-03	6.390E-03	2.119E-03
M 8171(100)	13.07	11.73	4.744E-03	4.744E-03	6.090E-03	6.090E-03	6.090E-03	6.090E-03	2.020E-03
T 2250(100)	13.09	11.74	4.779E-03	4.779E-03	6.090E-03	6.090E-03	6.090E-03	6.090E-03	2.020E-03
S 4080(100)	13.09	11.74	4.779E-03	4.779E-03	6.090E-03	6.090E-03	6.090E-03	6.090E-03	2.020E-03
T 2251(100)	14.17	12.43	4.514E-03	4.514E-03	5.823E-03	5.823E-03	5.823E-03	5.823E-03	1.931E-03
S 4081(100)	14.17	12.43	4.514E-03	4.514E-03	5.823E-03	5.823E-03	5.823E-03	5.823E-03	1.931E-03
M 8172(100)	14.17	12.43	4.514E-03	4.514E-03	5.823E-03	5.823E-03	5.823E-03	5.823E-03	1.931E-03
T 2252(100)	15.24	13.91	4.333E-03	4.333E-03	5.593E-03	5.593E-03	5.593E-03	5.593E-03	1.854E-03
S 4082(100)	15.24	13.91	4.333E-03	4.333E-03	5.593E-03	5.593E-03	5.593E-03	5.593E-03	1.854E-03
M 8173(100)	15.24	13.91	4.333E-03	4.333E-03	5.593E-03	5.593E-03	5.593E-03	5.593E-03	1.854E-03
MODEL WAS LEFT CENTERLINE									
T 2253(100)	16.32	14.98	4.231E-03	4.231E-03	5.384E-03	5.384E-03	5.384E-03	5.384E-03	1.787E-03
S 4083(100)	16.32	14.98	4.231E-03	4.231E-03	5.384E-03	5.384E-03	5.384E-03	5.384E-03	1.787E-03
M 8174(100)	16.32	14.98	4.231E-03	4.231E-03	5.384E-03	5.384E-03	5.384E-03	5.384E-03	1.787E-03

554

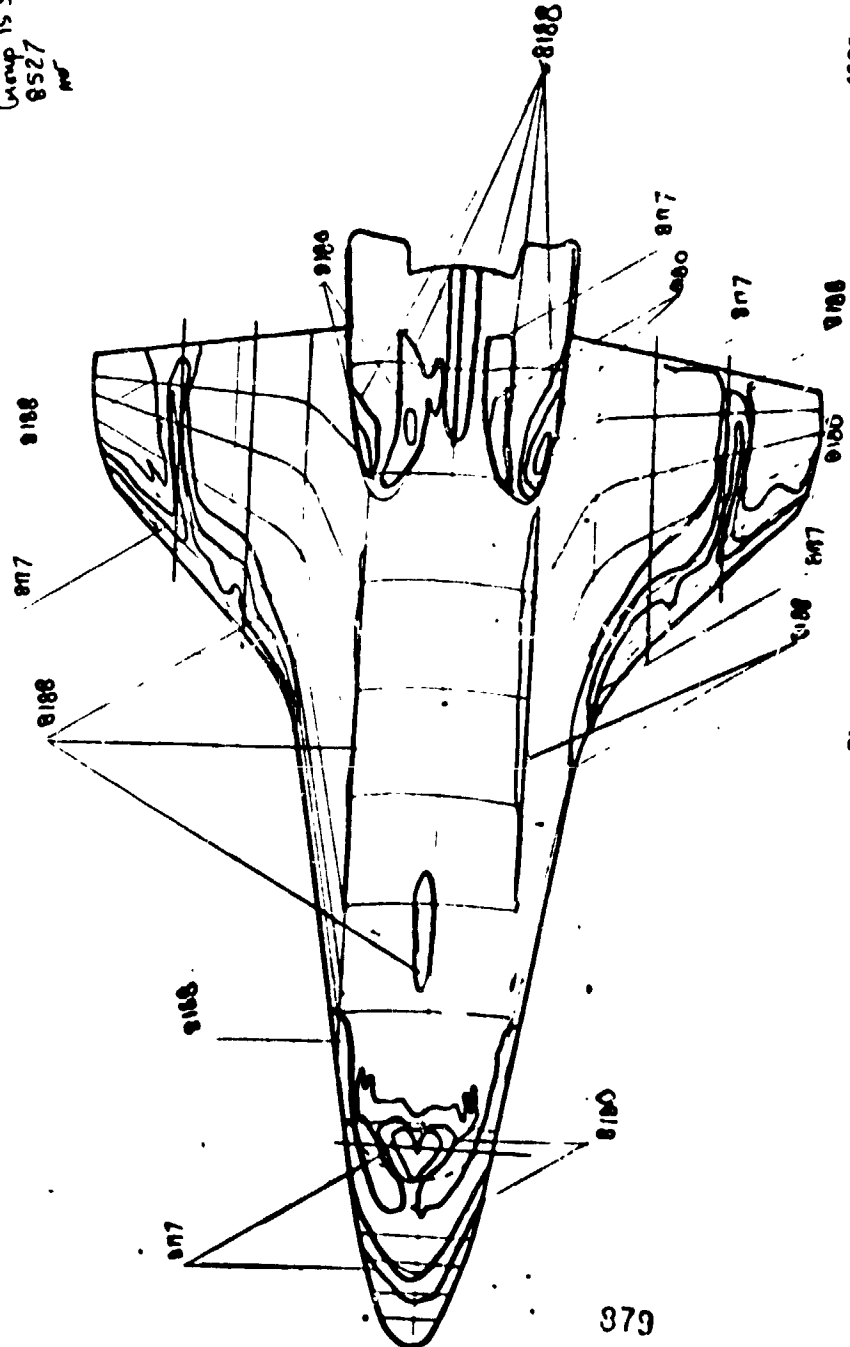
877



**Page 20**

Group 15.5  
8527  
100

4528  
 $\alpha = 30^\circ$   
 $\phi = 0^\circ$





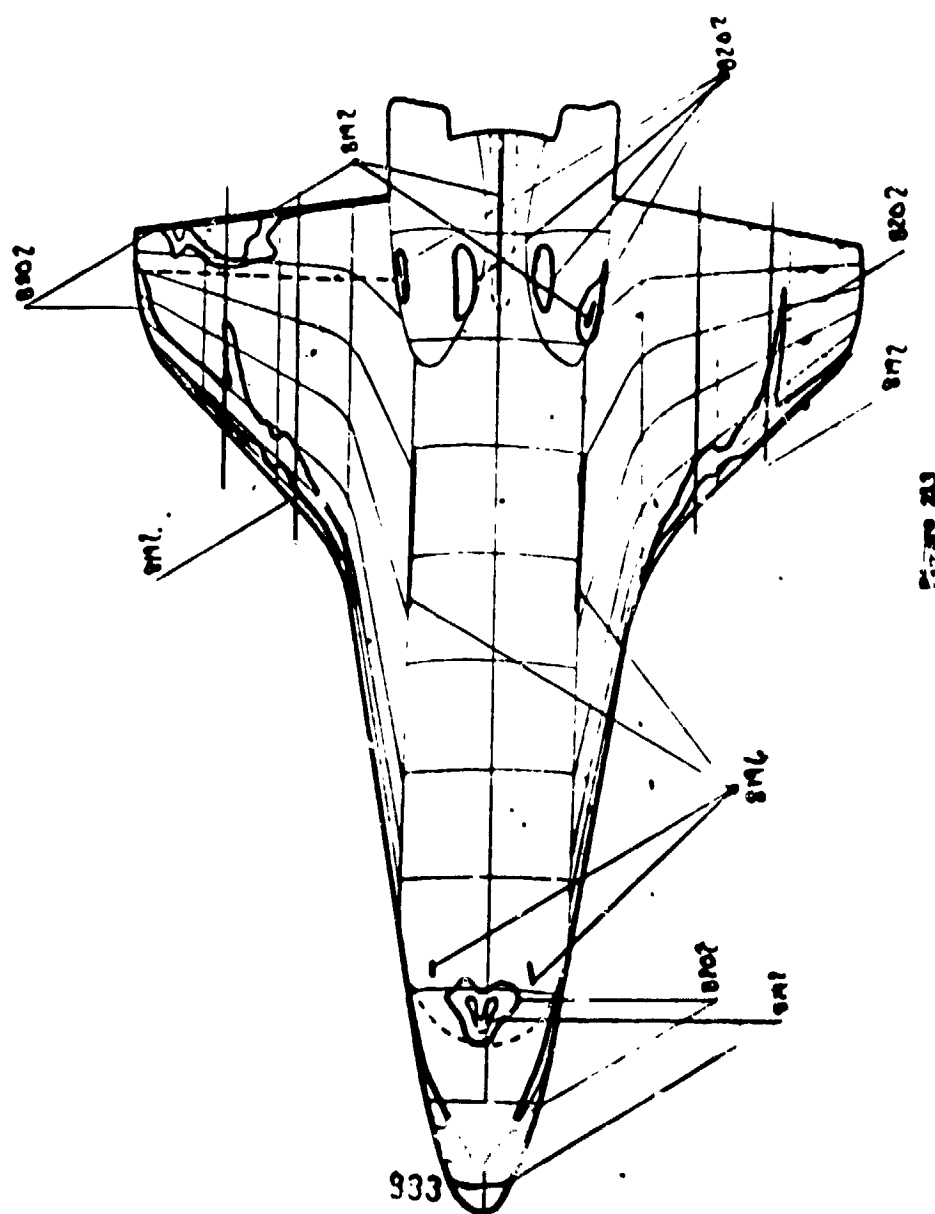




**Figure 212**



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NASA-HI ORBITER PEATING

AFDC (ARO, INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL R

VA290

GROUP CONFIG MODEL MACH NO PO (PSIA) TO (DEG R) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREHEND ROLL-MODEL YAW  
 154 3 ORBITER E 2.00 260.7 1303 30.05 -0.05 -30.00 -180.00 -0.00  
 T-INF P-INF Q-INF V-INF RMO-INF MU-INF WF/FT HREF SIMEF  
 (DEG R) (PSIA) (P-1) (FT/SEC) (SLUGS/FT3) (LP-SEC/FT2) (FT-1) (R= .0175FI) (R= .0175FI)  
 94.0 3.949 3946 7.488E-05 7.452E-08 3.669E 06 4.921E-02 2.117E-02  
 CAMERA ROLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHUXCAK) TRAR(TO) BETA(TO)  
 TOP(T) 8218  
 SIF(TS) 7212  
 MOTIC(B) 8527 131 79 0.0486 0 0

PIC NO TIME DELTME H(TO) HREF H(-9TO) H(TO)/HREF H(-9TO) H(-913TO)/HREF ST(TO)

T 2264(131) 1.18 MODEL HAS NOT REACHED CENTERLINE  
 S 4499(131) 1.18 MODEL HAS NOT REACHED CENTERLINE  
 H 3193(131) 1.18 MODEL HAS NOT REACHED CENTERLINE  
 T 2270(131) 2.25  
 S 4100(131) 2.25 MODEL HAS NOT REACHED CENTERLINE  
 H 213(131) 2.25 MODEL HAS NOT REACHED CENTERLINE

INJECT TIME = 2.40

T 2271(131) 3.35 DATA NOT YET VALID

S 4101(131) 3.35 DATA NOT YET VALID

H 4192(131) 3.35 DATA NOT YET VALID

T 2272(131) 4.43 3.08 1.629E-03 .0331 1.975E-03 .0401 1.923E-03 .0391 6.944E-04  
 S 4102(131) 4.43 3.08 1.629E-03 .0331 1.975E-03 .0401 1.923E-03 .0391 6.944E-04  
 H 4193(131) 4.43 3.08 1.629E-03 .0331 1.975E-03 .0401 1.923E-03 .0391 6.944E-04  
 T 2273(131) 5.51 4.14 1.403E-03 .0245 1.700E-03 .0345 1.655E-03 .0335 5.978E-04  
 S 4103(131) 5.51 4.14 1.403E-03 .0245 1.700E-03 .0345 1.655E-03 .0335 5.978E-04  
 H 4194(131) 5.51 4.14 1.403E-03 .0245 1.700E-03 .0345 1.655E-03 .0335 5.978E-04  
 T 2274(131) 6.61 5.24 1.247E-03 .0253 1.512E-03 .0344 1.650E-03 .0335 5.960E-04  
 S 4104(131) 6.61 5.24 1.247E-03 .0253 1.512E-03 .0344 1.650E-03 .0335 5.960E-04  
 H 4195(131) 6.61 5.24 1.247E-03 .0253 1.512E-03 .0344 1.650E-03 .0335 5.960E-04  
 T 2275(131) 7.69 6.34 1.146E-03 .0231 1.377E-03 .0307 1.472E-03 .0299 5.315E-04  
 S 4105(131) 7.69 6.34 1.146E-03 .0231 1.377E-03 .0307 1.472E-03 .0299 5.315E-04  
 H 4196(131) 7.69 6.34 1.146E-03 .0231 1.377E-03 .0307 1.472E-03 .0299 5.315E-04  
 T 2276(131) 8.79 7.44 1.044E-03 .0213 1.271E-03 .0280 1.341E-03 .0272 4.841E-04  
 S 4106(131) 8.79 7.44 1.044E-03 .0213 1.271E-03 .0280 1.341E-03 .0272 4.841E-04  
 H 4197(131) 8.79 7.44 1.044E-03 .0213 1.271E-03 .0280 1.341E-03 .0272 4.841E-04  
 T 2277(131) 9.86 8.51 9.803E-04 .0199 1.184E-03 .0241 1.157E-03 .0235 4.177E-04  
 S 4107(131) 9.86 8.51 9.803E-04 .0199 1.184E-03 .0241 1.157E-03 .0235 4.177E-04  
 H 4198(131) 9.86 8.51 9.803E-04 .0199 1.184E-03 .0241 1.157E-03 .0235 4.177E-04

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7/11/73

NASA-HI ORBITER HEATING

AFDC(JRO-INC.) ARNOLD AFS, TENNESSEE  
VON KARMAN GAS DYNAMICS FACILITY  
50 INCH HYPERSONIC TUNNEL R

VAPR9

GROUP CONFID MODEL MACH NO PO(P/SIA) TO( DEG R) ALPHA-MODEL ALPHA-SECTION ALPHA-PREPEND ROLL-MODEL YAW  
156 3 ORBITER E 8.00 861.3 1363 39.05 -0.05 -30.00 -180.00 -0.00

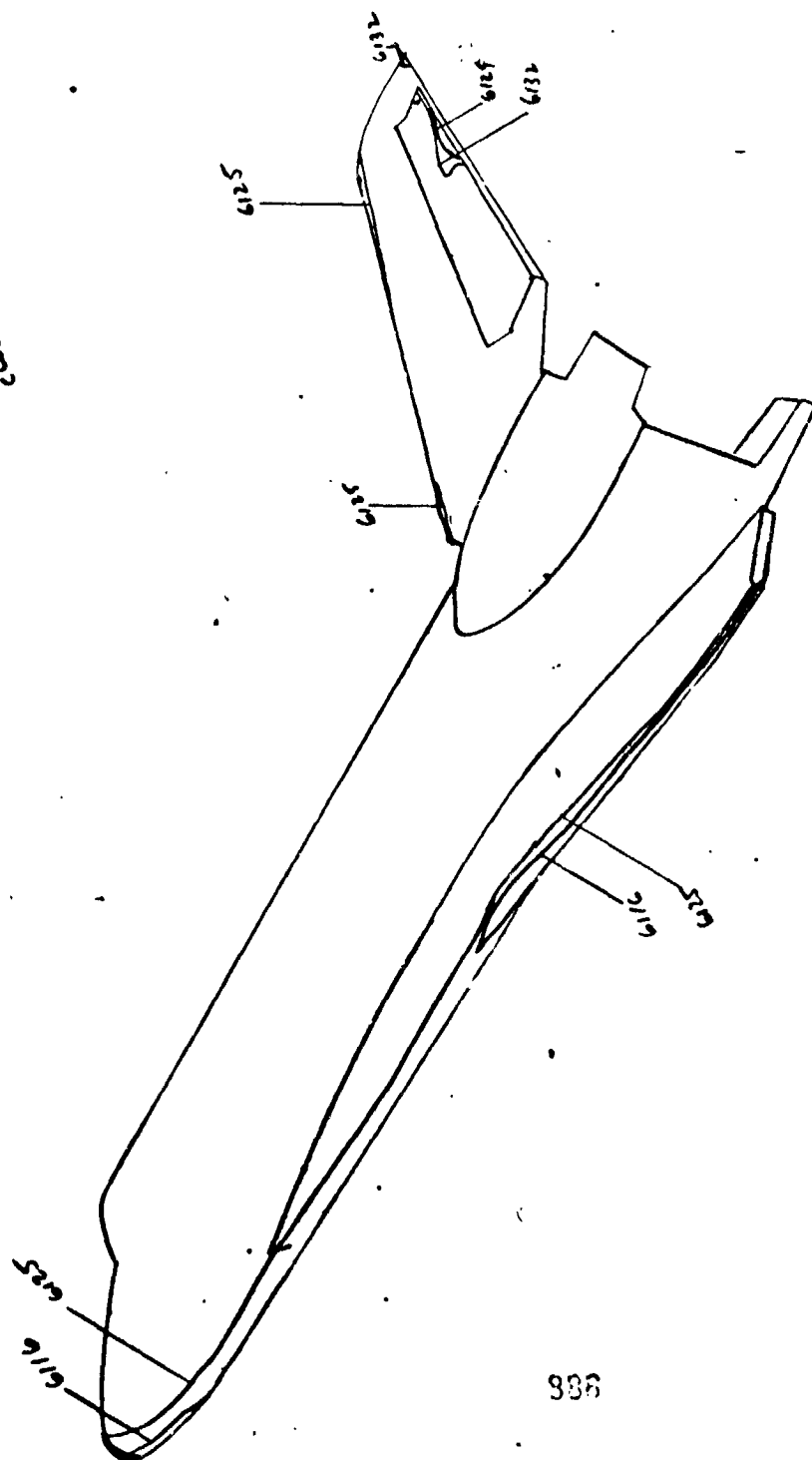
T-INF P-INF Q-INF V-INF MU-INF RE/FT MRFF STREF  
(DEG R) (PSIA) (PSIA) (FT/SEC) (SLUGS/FT<sup>3</sup>) (LB-SEC/FT<sup>2</sup>) (F1-1) (R= .0175F1) (R= .0175F1)  
90.8 .088 3.952 3896 7.494E-05 7.952E-08 3.472E 06 4.923E-02 2.116E-02

CAPRA WOLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RH0XCK) TRAR(TO) BETAITO)  
TOR(T) 8218 79 .0486 6.312E-02 5.8851E-02  
NCF(S) 7212  
MOTTCM(B) 8527

PTC NO	TIME DELTIME	H(TO)	M(TO)/HREF	M(9TO)	M(9TO)/HREF	M(913TO)	H(913TO)/HREF	ST(TO)
M 8194(131)	10.54	9.237E-04	.0188	1.119E-03	.0227	1.090E-03	.0221	3.934E-04
T 2274(131)	10.56	9.225E-04	.0187	1.114E-03	.0227	1.088E-03	.0221	3.930E-04
S 6108(131)	10.56	9.225E-04	.0187	1.114E-03	.0227	1.088E-03	.0221	3.930E-04
T 2274(131)	12.04	8.748E-04	.0178	1.060E-03	.0215	1.032E-03	.0210	3.726E-04
S 6108(131)	12.04	8.748E-04	.0178	1.060E-03	.0215	1.032E-03	.0210	3.726E-04
M 8208(131)	12.04	8.748E-04	.0178	1.060E-03	.0215	1.032E-03	.0210	3.726E-04
T 2274(131)	13.12	8.338E-04	.0169	1.011E-03	.0205	9.838E-04	.0200	3.552E-04
S 6116(131)	13.12	8.338E-04	.0169	1.011E-03	.0205	9.838E-04	.0200	3.552E-04
M 8208(131)	13.12	8.338E-04	.0169	1.011E-03	.0205	9.838E-04	.0200	3.552E-04
T 2274(131)	14.22	7.941E-04	.0152	9.673E-04	.0196	9.417E-04	.0191	3.400E-04
S 6111(131)	14.22	7.941E-04	.0152	9.673E-04	.0196	9.417E-04	.0191	3.400E-04
M 8208(131)	14.22	7.941E-04	.0152	9.673E-04	.0196	9.417E-04	.0191	3.400E-04
T 2274(131)	14.22	7.941E-04	.0152	9.673E-04	.0196	9.417E-04	.0191	3.400E-04
S 6111(131)	14.22	7.941E-04	.0152	9.673E-04	.0196	9.417E-04	.0191	3.400E-04

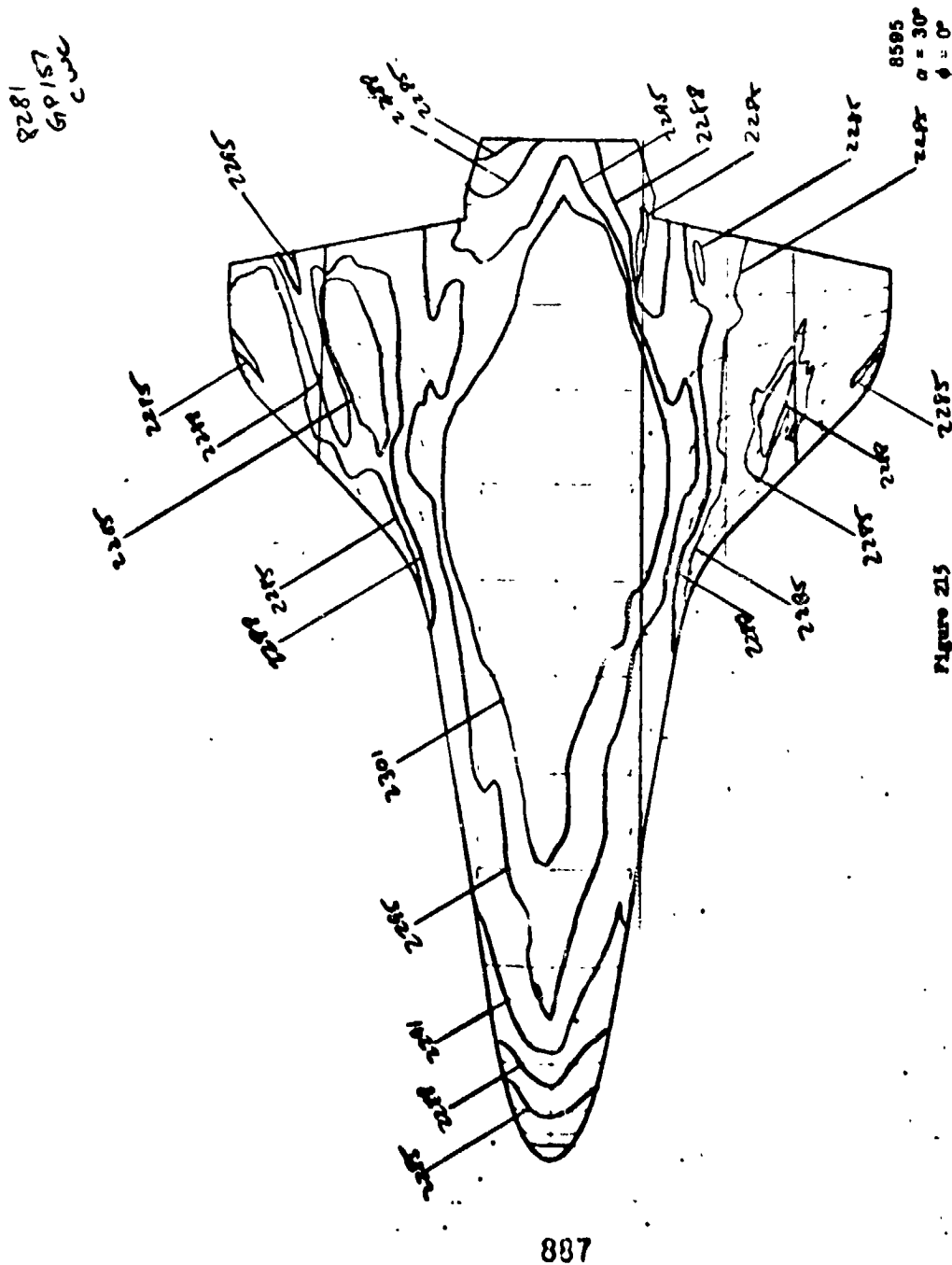
MODEL HAS LEFT CENTERLINE

7612  
6P157  
CWC



986

Figure 214



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NASA-RI ORBITER HEATING

VA289

AED(ARO,INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL R

GROUP CONFIG MODEL MACH NO PO(PSIA) TO(PSIA) ALPHA-MODEL ALPHA-SECTION ALPHA-REBEND ROLL-MODEL YAW  
 1-7 2 ORBITER S 7.98 544.8 1312 30.04 -0.04 -30.00 -180.00 -0.00

T-1AF P-1NF Q-1AF V-1NF RHO-INF MU-INF RF/FT HREF STREF  
 (DEG R) (PSIA) (FT/SEC) (SLUGS/FT3) (LB-SEC/FT2) (FT-1) (R# .0175EI) (R# .0175FT)  
 95.0 .057 2.528 3821 4.983E-05 7.688E-08 2.477E 06 3.911E-02 2.585E-02

CAMERA ROLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHOXCK) TRAR(TO) BETA(TO)

TOE(T) 8215  
 SIDE(S) 7212  
 MOTTCH(R) 8527

0.535

0

0

PIC NO TIME DELTIME H(TO) H(TO)/HREF M(.9TO) H(TO)/HREF M(.913TO) M(.913TO)/HREF ST(TO)

1 2292(250) 1.18 MODEL HAS NOT REACHED CENTERLINE  
 5 4112(250) 1.18 MODEL HAS NOT REACHED CENTERLINE  
 M 2204(250) 1.18 MODEL HAS NOT REACHED CENTERLINE  
 M 2204(250) 2.25 MODEL HAS NOT REACHED CENTERLINE  
 1 2243(250) 2.28 MODEL HAS NOT REACHED CENTERLINE  
 5 4113(250) 2.28 MODEL HAS NOT REACHED CENTERLINE

INJECT TIME = 2.40

1 2244(250) 3.35 DATA NOT YET VALID  
 5 4114(250) 3.35 DATA NOT YET VALID

M 2204(250) 3.35 7.125E-03 .1422 9.002E-03 .2302 8.714E-03 .2229 4.639E-03  
 M 2204(250) 4.43 7.125E-03 .1422 9.002E-03 .2302 8.714E-03 .2229 4.639E-03  
 5 4114(250) 4.43 7.046E-03 .1415 8.955E-03 .2293 8.679E-03 .2220 4.620E-03  
 M 2207(250) 5.51 4.14E-03 .1569 7.749E-03 .1982 7.502E-03 .1918 3.991E-03  
 1 2244(250) 5.53 4.14E-03 .1564 7.724E-03 .1976 7.479E-03 .1913 3.980E-03  
 5 4114(250) 5.53 4.14E-03 .1564 7.724E-03 .1976 7.479E-03 .1913 3.980E-03  
 1 2247(250) 6.61 5.26 5.454E-03 .1394 6.898E-03 .1762 6.670E-03 .1705 3.547E-03  
 5 4117(250) 6.61 5.26 5.454E-03 .1394 6.898E-03 .1762 6.670E-03 .1705 3.547E-03  
 M 2204(250) 6.61 5.26 4.949E-03 .1271 6.278E-03 .1565 6.077E-03 .1534 3.232E-03  
 1 2244(250) 7.71 4.24 4.949E-03 .1268 6.265E-03 .1492 6.065E-03 .1531 3.225E-03  
 5 4117(250) 7.71 4.24 4.949E-03 .1268 6.265E-03 .1492 6.065E-03 .1531 3.225E-03  
 1 2244(250) 8.79 7.44 4.546E-03 .1173 5.794E-03 .1482 5.604E-03 .1434 2.984E-03  
 5 4114(250) 8.79 7.44 4.546E-03 .1173 5.794E-03 .1482 5.604E-03 .1434 2.984E-03  
 M 2210(250) 8.79 7.44 4.546E-03 .1173 5.794E-03 .1482 5.604E-03 .1434 2.984E-03  
 M 2211(250) 9.86 7.451 4.247E-03 .1096 5.416E-03 .1385 5.243E-03 .1341 2.790E-03

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NASA-RI ORBITER PEATING AEDC/ARO, INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL R  
 VAZ89

GROUP CONFIG MODEL MACH NO POI(PSIA) TO(DEG R) ALPHA-MODEL ALPHA-SECTION ALPHA-PREBEND ROLL-MODEL YAW  
 157 2 ORBITER S 7.98 544.7 1311 30.04 -0.04 -30.00 -180.00 -0.00  
 1-TAF P-INF Q-INF V-INF RMG-INF MU-INF DE/FT HREF STREF  
 (DEG R) (PSIA) (FT/SEC) (SLUGS/FT<sup>3</sup>) (LB-SEC/FT<sup>2</sup>) (FT-LB) (LB-0.175EI) (RE-0.175EI)  
 95.4 .057 2.528 3820 4.986E-05 7.683E-08 2.479E 04 3.910E-02 2.584E-02  
 C4AFRA ROLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHOXCK) TRAR(TO) BETA(TO)  
 TOP(T) 8218  
 SIDE(S) 7212 83  
 BOTTOM(B) 8527 .0535 2.174E-01 2.3377E-01

PIC NO TIME DELTIME H(TO) H(TO)/HREF H(TO) H(TO)/HREF H(TO) H(TO)/HREF H(TO) H(TO)/HREF H(TO) H(TO)/HREF H(TO) H(TO)/HREF  
 T 2290(250) 9.89 8.54 4.280E-03 .1095 5.408E-03 .1383 5.235E-03 .1339 2.786E-03  
 S 6120(250) 9.89 8.54 4.280E-03 .1095 5.408E-03 .1383 5.235E-03 .1339 2.786E-03  
 T 2291(250) 10.56 9.51 4.033E-03 .1032 5.096E-03 .1303 4.933E-03 .1262 2.625E-03  
 S 6121(250) 10.56 9.51 4.033E-03 .1032 5.096E-03 .1303 4.933E-03 .1262 2.625E-03  
 M 6122(250) 10.56 9.51 4.033E-03 .1032 5.096E-03 .1303 4.933E-03 .1262 2.625E-03  
 M 6123(250) 12.04 10.69 3.825E-03 .0978 4.833E-03 .1235 4.678E-03 .1196 2.489E-03  
 T 2292(250) 12.04 10.69 3.825E-03 .0978 4.833E-03 .1235 4.678E-03 .1196 2.489E-03  
 S 6124(250) 12.04 10.69 3.825E-03 .0978 4.833E-03 .1235 4.678E-03 .1196 2.489E-03  
 S 6125(250) 12.06 10.71 3.821E-03 .0977 4.827E-03 .1235 4.673E-03 .1195 2.487E-03  
 T 2293(250) 13.14 11.79 3.642E-03 .0932 4.602E-03 .1177 4.454E-03 .1139 2.371E-03  
 S 6126(250) 13.14 11.79 3.642E-03 .0932 4.602E-03 .1177 4.454E-03 .1139 2.371E-03  
 M 6127(250) 13.14 11.79 3.642E-03 .0932 4.602E-03 .1177 4.454E-03 .1139 2.371E-03  
 T 2294(250) 14.22 12.87 3.487E-03 .0892 4.405E-03 .1126 4.264E-03 .1090 2.268E-03  
 S 6128(250) 14.22 12.87 3.487E-03 .0892 4.405E-03 .1126 4.264E-03 .1090 2.268E-03  
 M 6129(250) 14.24 12.89 3.483E-03 .0891 4.401E-03 .1125 4.260E-03 .1089 2.266E-03  
 T 2295(250) 15.32 13.97 3.346E-03 .0856 4.228E-03 .1081 4.073E-03 .1047 2.178E-03  
 S 6130(250) 15.32 13.97 3.346E-03 .0856 4.228E-03 .1081 4.073E-03 .1047 2.178E-03  
 M 6131(250) 15.32 13.97 3.346E-03 .0856 4.228E-03 .1081 4.073E-03 .1047 2.178E-03  
 T 2296(250) 16.39 15.04 3.224E-03 .0825 4.074E-03 .1042 3.943E-03 .1008 2.098E-03  
 S 6132(250) 16.39 15.04 3.224E-03 .0825 4.074E-03 .1042 3.943E-03 .1008 2.098E-03  
 M 6133(250) 16.39 15.04 3.224E-03 .0825 4.074E-03 .1042 3.943E-03 .1008 2.098E-03  
 T 2297(250) 17.47 16.12 3.115E-03 .0794 3.932E-03 .1006 3.810E-03 .0974 2.077E-03  
 S 6134(250) 17.47 16.12 3.115E-03 .0794 3.932E-03 .1006 3.810E-03 .0974 2.077E-03  
 M 6135(250) 17.50 16.15 3.113E-03 .0794 3.932E-03 .1006 3.810E-03 .0974 2.077E-03  
 T 2298(250) 17.50 16.15 3.113E-03 .0794 3.932E-03 .1006 3.810E-03 .0974 2.077E-03  
 S 6136(250) 17.57 17.22 3.014E-03 .0771 3.807E-03 .0974 3.686E-03 .0943 1.960E-03  
 T 2299(250) 17.57 17.22 3.014E-03 .0771 3.807E-03 .0974 3.686E-03 .0943 1.960E-03  
 S 6137(250) 17.57 17.22 3.014E-03 .0771 3.807E-03 .0974 3.686E-03 .0943 1.960E-03

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7/11/73

NASA-R1 ORBITER HEATING  
 VA289  
 AEDC (ARO, INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL 4

GROUP CONFIG MODEL MACH NO PO (PSIA) TO (DEG R) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREREND ROLL-MODEL YAW  
 157 2 GREITER S 7.98 544.8 1310 3n.04 -.04 -30.00 -180.00 --.00  
 T-INF P-INF Q-INF V-INF MU-INF MU-INF PE/FT MRFF STREF  
 (DEG R) (PSIA) (FT/SEC) (SLUGS/FT<sup>3</sup>) (LH-SEC/FT<sup>3</sup>) (FT-1) (R=.0175EI) (R=.0175EI)  
 95.4 .057 2.528 3819 4.049E-05 7.680E-08 2.481E 06 3.910E-02 2.581E-02

CAMERA HOLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHOACXX) TRAR(TO) RETAITO)  
 TOP(T) 8218 83  
 SIDE(S) 7212  
 BOTTOM(B) 8527 2.174E-01 2.3377E-01

PIC NO	TIME DELTME	H(TO)/HREF	H(.910)	H(.910)/HREF	H(.9130)	H(.9130)/HREF	ST(TO)
T 2290(250)	19.65	14.30	2.924E-03	.0749	3.576E-03	.0914	1.902E-03
S 412(250)	19.65	14.30	2.924E-03	.0749	3.576E-03	.0914	1.902E-03
M 4220(250)	19.65	14.30	2.924E-03	.0749	3.576E-03	.0914	1.902E-03
M 4221(250)	20.72	19.37	2.841E-03	.0727	3.590E-03	.0889	1.47E-03
T 2300(250)	20.75	19.40	2.840E-03	.0726	3.577E-03	.0888	1.47E-03
S 413(250)	20.75	19.40	2.840E-03	.0726	3.577E-03	.0888	1.47E-03
T 2301(250)	21.83	20.48	2.744E-03	.0707	3.492E-03	.0864	1.798E-03
S 4131(250)	21.83	20.48	2.744E-03	.0707	3.492E-03	.0864	1.798E-03
M 4222(250)	21.83	20.48	2.744E-03	.0707	3.492E-03	.0864	1.798E-03
T 2302(250)	22.50	21.55	2.644E-03	.0689	3.404E-03	.0843	1.753E-03
S 4132(250)	22.50	21.55	2.644E-03	.0689	3.404E-03	.0843	1.753E-03
M 4223(250)	22.50	21.55	2.644E-03	.0689	3.404E-03	.0843	1.753E-03
MODEL HAS LEFT CENTERLINE							
T 2303(250)	23.65	22.65	2.624E-03	.0672	3.322E-03	.0822	1.710E-03
S 4133(250)	23.65	22.65	2.624E-03	.0672	3.322E-03	.0822	1.710E-03
M 4224(250)	24.00	22.65	2.624E-03	.0672	3.322E-03	.0822	1.709E-03







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7/11/73

MASA-M1 ORBITER HEATING  
 VA289  
 AEDCIAROT-INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL W

GROUP CONFIG MODEL MACH NO PO(PSIA) TOL(SEC R) ALPHA-MODEL AL -SECTION ALPHA-PREBEND ROLL-MODEL YAN  
 1-4 4 0.01175 7.98 544.5 1313 30.05 05 -30.00 -180.00 -0.00  
 T-1AF P-INF Q-INF RHO-INF MU-INF HF/FT MRF STREF  
 (DEG R) (PSIA) (PSIA) (FT/SEC) (SLUGS/FT3) (LB-SEC/FT2) (FT-1) (RZ 175FT) (IN-0175FT)  
 0.07 7.507 3.00 5.013E-05 7.630E-08 2.500E 04 3.906E-02 2.575E-02  
 CAPREA KOLL NO PAINT IFMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHOXAK) TBAR(10) BETA(10)  
 021R  
 7212 250 P0 .0575 0 0  
 MOTTCH(B) .527

TIME DELTIME M(TO) M(TO)/MREF M(-91G) M(-91G)/MREF H(-913TO) H(-913TO)/MREF ST(10)  
 PTC NO  
 T 2304(250) 1.15 MODEL HAS NOT REACHED CENTERLINE  
 M 222(250) 1.15 MODEL HAS NOT REACHED CENTERLINE  
 S 5134(250) 1.15 MODEL HAS NOT REACHED CENTERLINE  
 T 2305(250) 2.25 MODEL HAS NOT REACHED CENTERLINE  
 S 4135(250) 2.25 MODEL HAS NOT REACHED CENTERLINE  
 M 2224(250) 2.25 MODEL HAS NOT REACHED CENTERLINE  
 INJECT TIME = 2.34  
 M 2227(250) 3.23 DATA NOT YET VALID  
 T 2306(250) 3.25 DATA NOT YET VALID  
 S 4136(250) 3.25 DATA NOT YET VALID  
 T 2307(250) 4.43 7.320E-03 .1475 9.272E-03 .2373 8.973E-03 .2297 4.755E-03  
 S 4137(250) 4.43 7.320E-03 .1475 9.272E-03 .2373 8.973E-03 .2297 4.755E-03  
 M 2228(250) 4.43 7.320E-03 .1475 9.272E-03 .2373 8.973E-03 .2297 4.755E-03  
 T 2308(250) 5.21 4.311E-03 .1416 7.947E-03 .2045 7.729E-03 .1979 4.096E-03  
 S 4138(250) 5.21 4.311E-03 .1416 7.947E-03 .2045 7.729E-03 .1979 4.096E-03  
 M 2229(250) 6.24 5.627E-03 .1440 7.121E-03 .1522 6.891E-03 .1764 3.650E-03  
 T 2309(250) 6.24 5.627E-03 .1440 7.121E-03 .1522 6.891E-03 .1764 3.650E-03  
 S 4139(250) 6.24 5.627E-03 .1440 7.121E-03 .1522 6.891E-03 .1764 3.650E-03  
 M 2230(250) 7.26 5.126E-03 .1312 6.487E-03 .1561 6.277E-03 .1407 3.328E-03  
 T 2310(250) 7.26 5.126E-03 .1312 6.487E-03 .1561 6.277E-03 .1407 3.328E-03  
 S 4140(250) 7.26 5.126E-03 .1312 6.487E-03 .1561 6.277E-03 .1407 3.328E-03  
 M 2231(250) 7.68 4.740E-03 .1211 5.946E-03 .1572 5.793E-03 .1483 3.069E-03  
 T 2311(250) 7.68 4.740E-03 .1211 5.946E-03 .1572 5.793E-03 .1483 3.069E-03  
 S 4141(250) 7.68 4.740E-03 .1211 5.946E-03 .1572 5.793E-03 .1483 3.069E-03  
 M 2232(250) 8.24 4.305E-03 .1132 5.595E-03 .1432 5.414E-03 .1346 2.868E-03  
 T 2312(250) 8.24 4.305E-03 .1132 5.595E-03 .1432 5.414E-03 .1346 2.868E-03  
 S 4142(250) 8.24 4.305E-03 .1132 5.595E-03 .1432 5.414E-03 .1346 2.868E-03  
 M 2233(250) 9.24 4.421E-03 .1132 5.595E-03 .1432 5.414E-03 .1346 2.868E-03

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 7/11/77

AEUC(ARM-INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL R

NASA-WI ORBITER HEATING

VA285

GROUP CONFIG MODEL MACH NO POI(PSIA) TOI(EG R) ALPHA-MODEL ALPHA-SECTION ALPHA-PREHEND ROLL-MODEL YAW

1 4 4 CRITER F1 7.98 544.9 1303 30.05 -0.05 -30.00 -180.00 -0.00

T-INF P-INF O-INF V-INF RMO-INF MU-INF RF/FT MRFF STREF  
 (DEG R) (PSIA) (PSIA) (FT/SEC) (SLUGS/FT) (FT-1) (RZ .0175FT) (RZ .0175FT)  
 94.0 .057 2.529 3894 5.019E-05 7.637E-04 2.503E 06 3.907E-02 2.574E-02

CAMERA ROLL 00 PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RMO/CRK) TRANSIT TO BETA(TO)

TOP(T) RZTH  
 7217  
 BOTTOM(B) 8527

250 R0 .0535 2.229E-01 2.4093E-01

PIC NO TIME DELTIME M(TO) M(TO)/MREF M(.QTO) MREF M(.QTO)/MREF M(.Q13TO) MREF M(.Q13TO)/MREF ST(TO)

1 2113(250) 13.51 9.58 4.145E-03 4.145E-03 5.271E-03 5.271E-03 1.349 5.101E-03 1.305 2.701E-03

2 2113(250) 13.51 9.58 4.145E-03 4.145E-03 5.271E-03 5.271E-03 1.349 5.101E-03 1.305 2.701E-03

3 2113(250) 13.51 9.58 4.145E-03 4.145E-03 5.271E-03 5.271E-03 1.349 5.101E-03 1.305 2.701E-03

4 2113(250) 13.51 9.58 4.145E-03 4.145E-03 5.271E-03 5.271E-03 1.349 5.101E-03 1.305 2.701E-03

5 2113(250) 13.51 9.58 4.145E-03 4.145E-03 5.271E-03 5.271E-03 1.349 5.101E-03 1.305 2.701E-03

6 2113(250) 13.51 9.58 4.145E-03 4.145E-03 5.271E-03 5.271E-03 1.349 5.101E-03 1.305 2.701E-03

7 2113(250) 13.51 9.58 4.145E-03 4.145E-03 5.271E-03 5.271E-03 1.349 5.101E-03 1.305 2.701E-03

8 2113(250) 13.51 9.58 4.145E-03 4.145E-03 5.271E-03 5.271E-03 1.349 5.101E-03 1.305 2.701E-03

9 2113(250) 13.51 9.58 4.145E-03 4.145E-03 5.271E-03 5.271E-03 1.349 5.101E-03 1.305 2.701E-03

10 2113(250) 13.51 9.58 4.145E-03 4.145E-03 5.271E-03 5.271E-03 1.349 5.101E-03 1.305 2.701E-03

11 2113(250) 13.51 9.58 4.145E-03 4.145E-03 5.271E-03 5.271E-03 1.349 5.101E-03 1.305 2.701E-03

12 2113(250) 13.51 9.58 4.145E-03 4.145E-03 5.271E-03 5.271E-03 1.349 5.101E-03 1.305 2.701E-03

13 2113(250) 13.51 9.58 4.145E-03 4.145E-03 5.271E-03 5.271E-03 1.349 5.101E-03 1.305 2.701E-03

14 2113(250) 13.51 9.58 4.145E-03 4.145E-03 5.271E-03 5.271E-03 1.349 5.101E-03 1.305 2.701E-03

15 2113(250) 13.51 9.58 4.145E-03 4.145E-03 5.271E-03 5.271E-03 1.349 5.101E-03 1.305 2.701E-03

16 2113(250) 13.51 9.58 4.145E-03 4.145E-03 5.271E-03 5.271E-03 1.349 5.101E-03 1.305 2.701E-03

17 2113(250) 13.51 9.58 4.145E-03 4.145E-03 5.271E-03 5.271E-03 1.349 5.101E-03 1.305 2.701E-03

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Group 159  
B527  
no

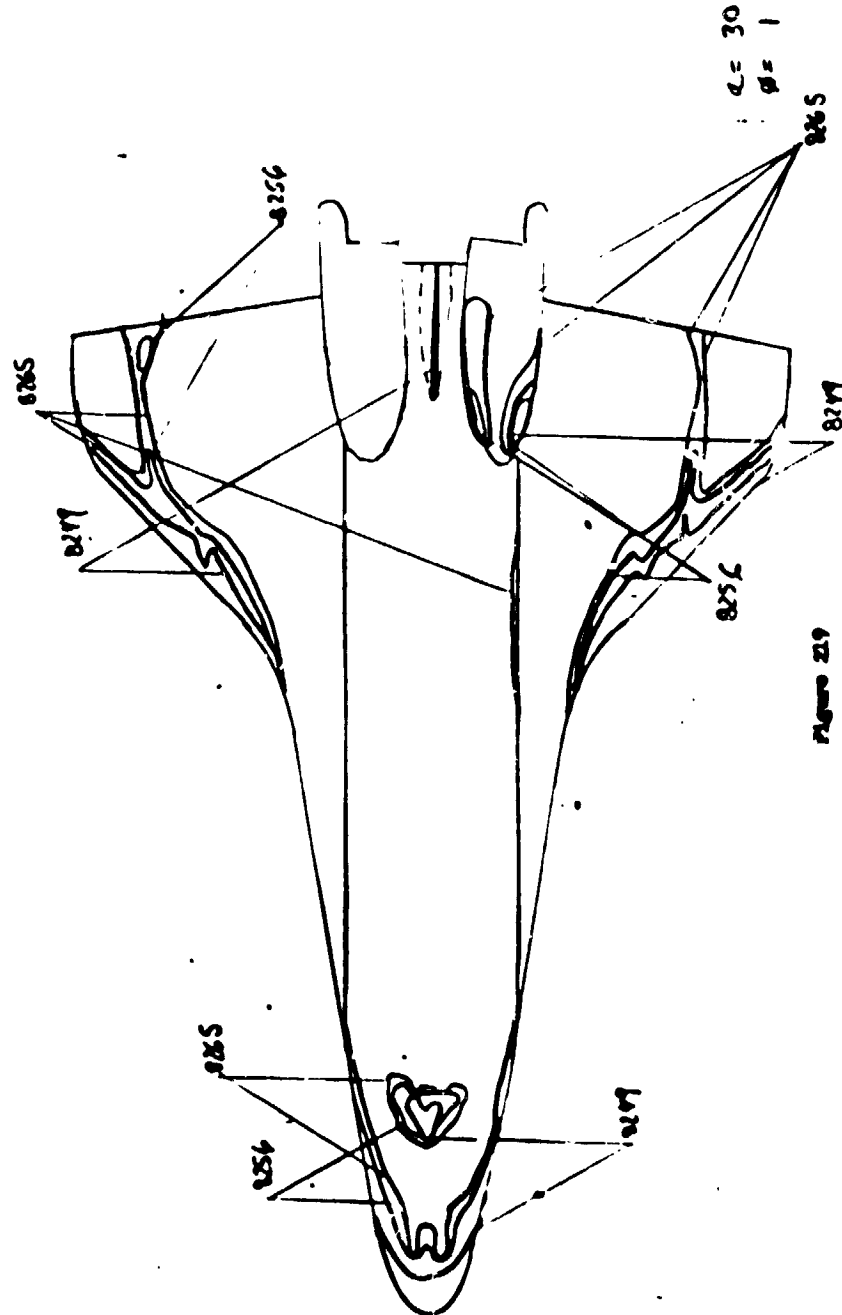


Figure 219

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7/11/73

NASA-NI ORBITER HEATING  
 VA209  
 AFDC(ARD, INC.) ANNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL A

GROUP CONFIG MODEL MACH NO PO(P5IA) TO(DEC R) ALPHA-MODEL ALPHA-SECTION ALPHA-PREHEND ROLL-MODEL YAW  
 100 2 ORBITER S 7.98 424.1 1299 30.03 -.05 -30.00 -182.00 1.00

T-INF P-INF U-INF V-INF RHO-INF MU-INF HREF HREF SINEF  
 (DEG R) (PSIA) (FT/SEC) (SLUGS/FT3) (LB-SEC/FT2) (FT-L) (R= .0175FI) (R= .0175FI)  
 94.4 .344 1.948 3803 3.017E-05 7.014E-08 1.956E 06 3.445E-02 2.912E-02

CAMERA MOLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHOXCXK) TRAR(TO) BETA(TO)  
 TOP(1) 8218 113 81 .0475 0 0  
 SIDE(5) 7212  
 BOTTOM(9) 8521

PIC NO TIME DELTME H(TO) H(TO)/HREF H(TO) H(TO)/HREF H(TO)/HREF H(TO)/HREF H(TO)/HREF ST(TO)

1 2324(113) 1.15 MODEL HAS NOT REACHED CENTERLINE  
 2 4154(113) 1.15 MODEL HAS NOT REACHED CENTERLINE  
 3 4244(113) 1.15 MODEL HAS NOT REACHED CENTERLINE  
 4 2277(113) 2.25 MODEL HAS NOT REACHED CENTERLINE  
 5 4157(113) 2.25 MODEL HAS NOT REACHED CENTERLINE  
 6 4247(113) 2.25 MODEL HAS NOT REACHED CENTERLINE

INJECT TIME = 2.3

DATA NOT YET VALID

DATA NOT YET VALID

DATA NOT YET VALID

1 2324(113) 3.07 1.049E-03 .0304 1.276E-03 .0370 1.242E-03 .0360 8.785E-04  
 2 4154(113) 3.07 1.049E-03 .0304 1.276E-03 .0370 1.242E-03 .0360 8.785E-04  
 3 4244(113) 3.07 1.049E-03 .0304 1.276E-03 .0370 1.242E-03 .0360 8.785E-04  
 4 2277(113) 4.41 3.14 1.049E-03 .0304 1.276E-03 .0370 1.242E-03 .0360 8.785E-04  
 5 4157(113) 4.41 3.14 1.049E-03 .0304 1.276E-03 .0370 1.242E-03 .0360 8.785E-04  
 6 4247(113) 5.51 4.17 9.003E-04 .0261 1.095E-03 .0317 1.065E-03 .0309 7.538E-04  
 7 2331(113) 5.51 4.17 9.003E-04 .0261 1.095E-03 .0317 1.065E-03 .0309 7.538E-04  
 8 4154(113) 5.25 5.25 8.027E-04 .0233 9.759E-04 .0283 9.494E-04 .0275 6.717E-04  
 9 4244(113) 5.25 5.25 8.027E-04 .0233 9.759E-04 .0283 9.494E-04 .0275 6.717E-04  
 10 2277(113) 6.58 6.58 8.027E-04 .0233 9.759E-04 .0283 9.494E-04 .0275 6.717E-04  
 11 4157(113) 7.06 6.32 7.312E-04 .0212 8.990E-04 .0258 8.652E-04 .0251 6.115E-04  
 12 4247(113) 7.06 6.32 7.312E-04 .0212 8.990E-04 .0258 8.652E-04 .0251 6.115E-04  
 13 2331(113) 7.68 6.35 7.027E-04 .0212 8.472E-04 .0257 8.634E-04 .0250 5.134E-04  
 14 4154(113) 8.76 7.43 6.748E-04 .0196 8.204E-04 .0238 7.985E-04 .0231 5.643E-04  
 15 4244(113) 8.76 7.43 6.748E-04 .0196 8.204E-04 .0238 7.985E-04 .0231 5.643E-04  
 16 2277(113) 8.76 7.43 6.748E-04 .0196 8.204E-04 .0238 7.985E-04 .0231 5.643E-04  
 17 4157(113) 9.84 8.50 6.306E-04 .0183 7.667E-04 .0222 7.462E-04 .0216 5.273E-04  
 18 4247(113) 9.84 8.50 6.306E-04 .0183 7.667E-04 .0222 7.462E-04 .0216 5.273E-04

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7/11/73

AEDC(ARND-INC.) ARNOLD AFS, TENNESSEE  
VON KARMAN GAS DYNAMICS FACILITY  
50 INCH HYPERSONIC TUNNEL R

NASA-RI ORBITER HEATING

VA2HC

GROUP	CNFIC	MODEL	MACH NO	PO(PSIA)	TO(DEG R)	ALPHA-MODEL	ALPHA-SECTION	ALPHA-PREHEND	ROLL-MODEL	YAW
100	2	ORBITER S	7.98	425.4	1259	30.03	-0.05	-30.00	-182.00	1.00
T-1NF	D-1NF	Q-1NF	V-1NF	RHO-1NF	MU-1NF	RF/FT	MREF	STREF		
(DEG R)	(PSIA)	(FT/SEC)	(SLUGS/FT <sup>3</sup> )	(LR-SEC/FT <sup>2</sup> )	(FT-1)	(R=)	(R=)	(R=)		
94.4	0.44	1.974	3802	3.930E-05	7.613E-08	1.963E 06	3.450E-02	2.907E-02		
CAMFRA	ROLL NO	PAINT IFMP (DEG F)	INITIAL TEMP (DEG F)	SQUARE ROOT (RHOXCAK)	TRAR(TO)	BETA(TO)				
20P(T)	8218									
510F(S)	7212									
MOITCH(B)	8527									

PIC NO	TIME RELTIME	H(TO)	H(TO)/HREF	H(.910)	M(.910)/HREF	H(.912TO)	H(.912TO)/HREF	ST(TO)
T 2335(113)	10.51	5.941E-04	.0172	7.224E-04	.0209	7.030E-04	.0204	4.965E-04
M 2355(113)	10.51	5.941E-04	.0172	7.224E-04	.0209	7.030E-04	.0204	4.965E-04
S 6165(113)	10.54	5.944E-04	.0172	7.214E-04	.0209	7.021E-04	.0203	4.959E-04
M 2355(113)	10.54	5.944E-04	.0172	7.214E-04	.0209	7.021E-04	.0203	4.959E-04
T 2335(113)	12.01	5.627E-04	.0163	6.841E-04	.0198	6.658E-04	.0193	4.701E-04
S 6166(113)	12.01	5.627E-04	.0163	6.841E-04	.0198	6.658E-04	.0193	4.701E-04
T 2337(113)	13.09	5.236E-04	.0155	6.520E-04	.0189	6.346E-04	.0184	4.479E-04
S 6167(113)	13.09	5.236E-04	.0155	6.520E-04	.0189	6.346E-04	.0184	4.479E-04
M 2357(113)	13.09	5.236E-04	.0155	6.520E-04	.0189	6.346E-04	.0184	4.479E-04
T 2337(113)	14.17	5.133E-04	.0149	6.241E-04	.0181	6.074E-04	.0176	4.286E-04
S 6168(113)	14.17	5.133E-04	.0149	6.241E-04	.0181	6.074E-04	.0176	4.286E-04
M 2358(113)	14.17	5.133E-04	.0149	6.241E-04	.0181	6.074E-04	.0176	4.286E-04
T 2339(113)	15.27	4.940E-04	.0143	5.995E-04	.0174	5.834E-04	.0169	4.115E-04
S 6169(113)	15.27	4.940E-04	.0143	5.995E-04	.0174	5.834E-04	.0169	4.115E-04
M 2359(113)	15.27	4.940E-04	.0143	5.995E-04	.0174	5.834E-04	.0169	4.115E-04
T 2340(113)	16.34	4.745E-04	.0137	5.770E-04	.0167	5.616E-04	.0163	3.962E-04
S 6170(113)	16.34	4.745E-04	.0137	5.770E-04	.0167	5.616E-04	.0163	3.962E-04
M 2360(113)	16.34	4.745E-04	.0137	5.770E-04	.0167	5.616E-04	.0163	3.962E-04
T 2341(113)	17.42	4.545E-04	.0133	5.574E-04	.0161	5.425E-04	.0157	3.827E-04
S 6171(113)	17.42	4.545E-04	.0133	5.574E-04	.0161	5.425E-04	.0157	3.827E-04
M 2361(113)	17.42	4.545E-04	.0133	5.574E-04	.0161	5.425E-04	.0157	3.827E-04
T 2342(113)	18.50	4.449E-04	.0129	5.396E-04	.0156	5.252E-04	.0152	3.705E-04
S 6172(113)	18.50	4.449E-04	.0129	5.396E-04	.0156	5.252E-04	.0152	3.705E-04
M 2362(113)	18.50	4.449E-04	.0129	5.396E-04	.0156	5.252E-04	.0152	3.705E-04
T 2343(113)	19.57	4.306E-04	.0125	5.235E-04	.0152	5.095E-04	.0147	3.591E-04

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7/11/73

NASA-HI ORBITER HEATING

VA289

AFDC(ARO, INC.) ARNOLD AFS, TENNESSEE  
VON KARMAN GAS DYNAMICS FACILITY  
50 INCH HYPERSONIC TUNNEL R

GROUP CONFIG MODEL MACH NO PO(PSIA) TO(UEG R) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREHEND ROLL-MODEL YAW  
159 2 ORBITER S 7.98 426.5 1299 30.03 -.05 -30.00 -182.00 1.00  
T-INF P-INF Q-INF V-INF RHO-INF MU-INF DE/FT HREF STREF  
(UEG R) (PSIA) (FT/SEC) (SLUGS/FT<sup>3</sup>) (LH-SEC/FT<sup>2</sup>) (FT-1) (R= .0175F1) (R=-.0175F1)  
94.6 .044 1.979 3402 3.040E-05 7.613E-08 1.968E 06 3.455E-02 2.904E-02

CAMERA ROLL NO PAINT IFWP (UEG F) INITIAL TEMP (DEG F) SQUARE ROOT (HHXCKX) TRAR(TO) BETA(TO)  
TOP(T) 8218 113 91 .0475 4.222E-02 3.8710E-02  
STRE(S) 7212  
NOTIC(9) 857

PIC NO	TIME DELTIME	H(TO)	H(TO)/HREF	H(.910)	H(.910)/HREF	H(.912TO)	H(.912TO)/HREF	ST(TO)
T 2743(113)	15.26	4.323E-04	.0125	5.231E-04	.0151	5.091E-04	.0147	3.589E-04
S 4173(113)	19.26	4.303E-04	.0125	5.231E-04	.0151	5.091E-04	.0147	3.589E-04
T 2744(113)	20.27	4.111E-04	.0121	5.024E-04	.0147	4.948E-04	.0143	3.486E-04
S 4174(113)	20.27	4.111E-04	.0121	5.024E-04	.0147	4.948E-04	.0143	3.486E-04
T 2745(113)	20.27	4.111E-04	.0121	5.024E-04	.0147	4.948E-04	.0143	3.486E-04
S 4175(113)	21.75	4.069E-04	.0118	4.948E-04	.0143	4.815E-04	.0139	3.392E-04
T 2746(113)	21.75	4.069E-04	.0118	4.948E-04	.0143	4.815E-04	.0139	3.392E-04
S 4176(113)	21.75	4.069E-04	.0118	4.948E-04	.0143	4.815E-04	.0139	3.392E-04
T 2747(113)	22.48	3.966E-04	.0115	4.822E-04	.0140	4.693E-04	.0136	3.305E-04
S 4177(113)	22.48	3.966E-04	.0115	4.822E-04	.0140	4.693E-04	.0136	3.305E-04
T 2748(113)	22.48	3.966E-04	.0115	4.822E-04	.0140	4.693E-04	.0136	3.305E-04
S 4178(113)	22.48	3.966E-04	.0115	4.822E-04	.0140	4.693E-04	.0136	3.305E-04

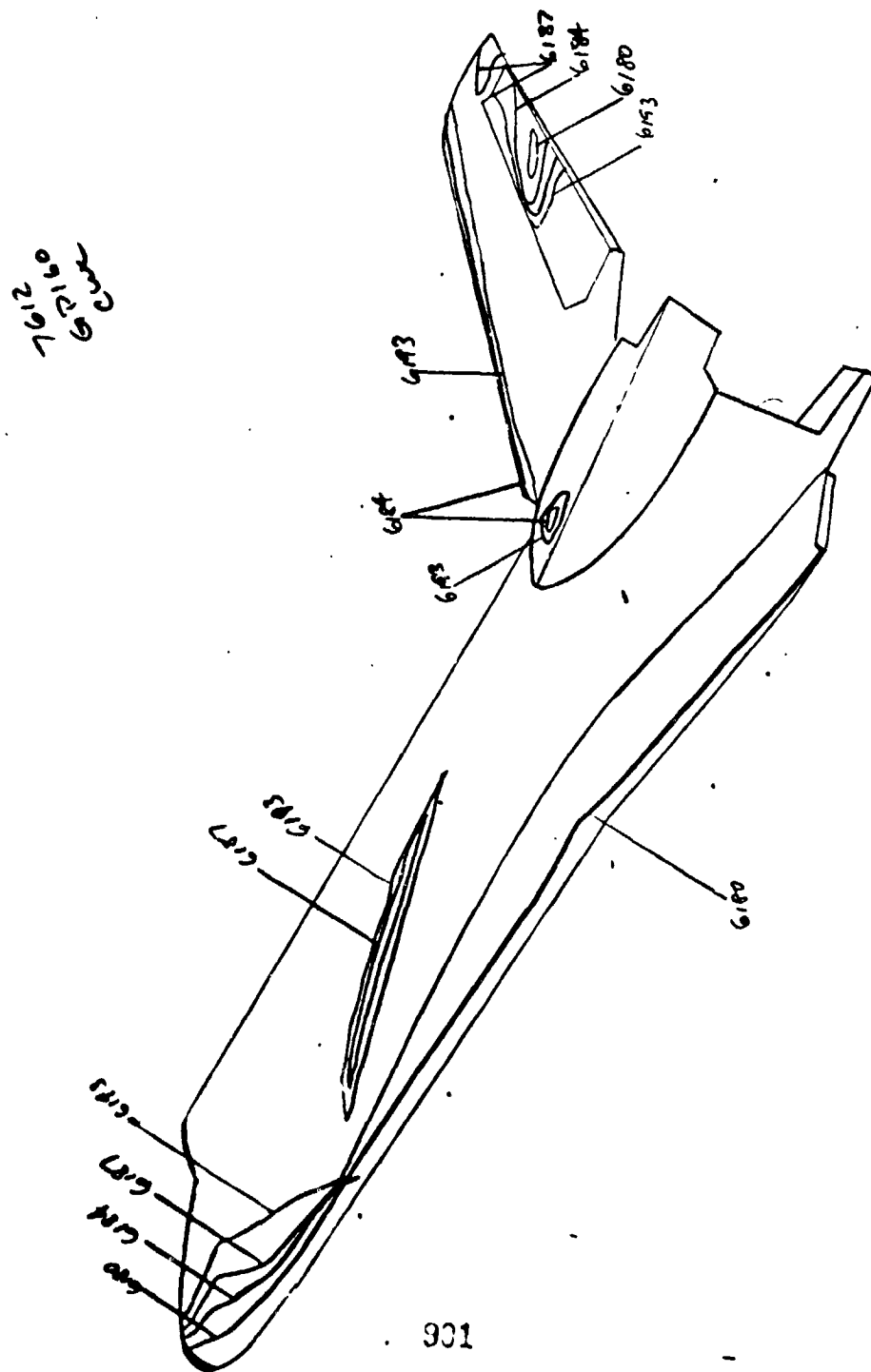
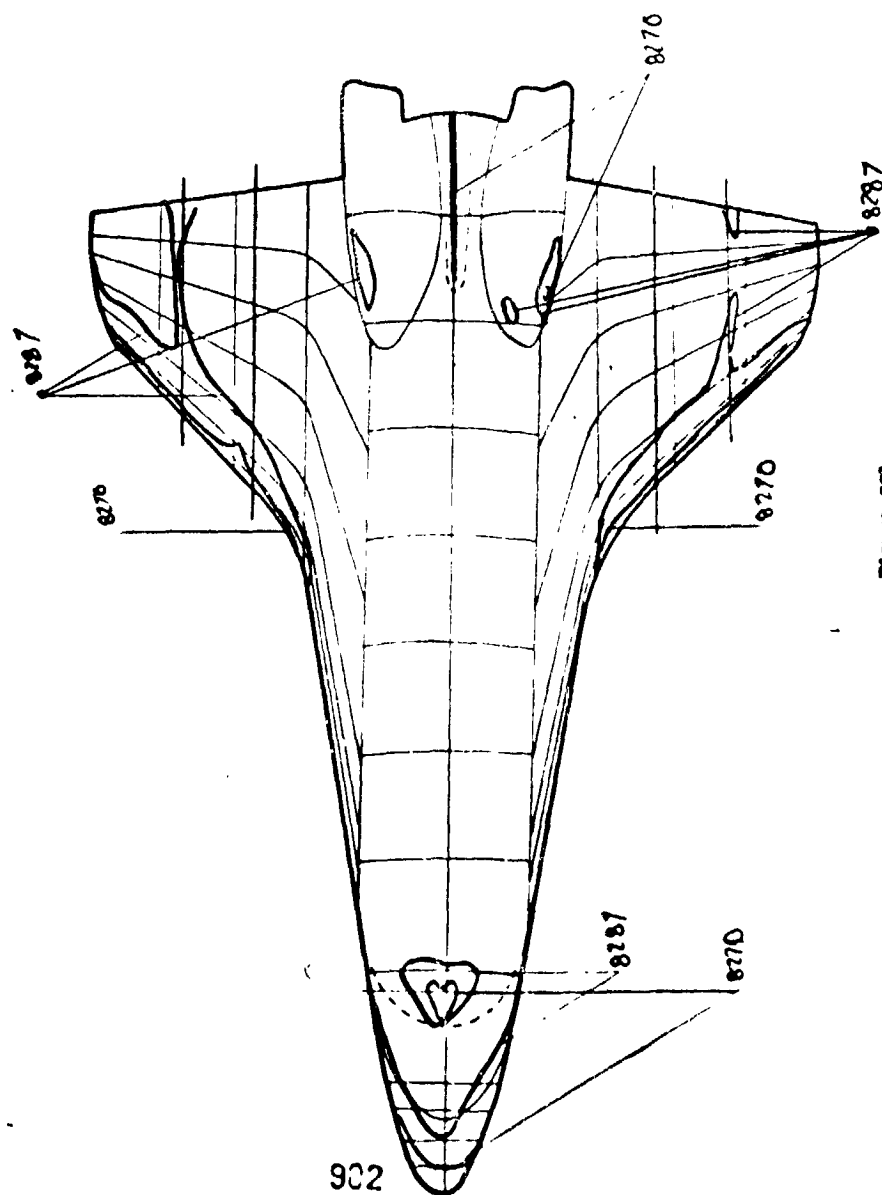


Figure 220

4528  
Q = 30°  
φ = 0°



**Figure 23**

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7/11/73

AFDC(AMC, INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL R

NASA-R1 ORBITER HEATING

VA2R9

GROUP CONFIG MODEL MACH NO PO(PSIA) TO( DEG R) ALPHA-MODEL ALPHA-SECTION ALPHA-PREHEND ROLL-MODEL YAW  
 160 2 ORBITER 5 7.98 424.2 1250 30.05 -0.05 -30.00 -100.00 -0.00  
 T-INF P-INF 0-INF V-INF MU-INF MU-INF MU-INF SINF  
 (DEG R) (PSIA) (PSIA) (FT/SEC) (SLUGS/FT<sup>3</sup>) (LB-SEC/FT<sup>2</sup>) (FT-1) (R<sub>2</sub>-0.175E11 (R<sub>2</sub>-0.175E11  
 93.9 .044 1.978 1789 3.045E-05 7.554E-02 1.08E 06 3.449E-02 2.892E-02  
 CAMERA ROLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHO/CAR) TRAR(TO) BETA(TO)  
 TOP(T) 8218  
 S(T(FS) 7212  
 MOTION(B) 8527  
 A0 .0475 0 0

PIC NO TIME RELTIME HITO HITO)/HREF H1(910) H1(910)/HREF H1(913TO) H1(913TO)/HREF ST(TO)  
 T 2347(113) 1.18 MODEL HAS NOT REACHED CENTERLINE  
 S 4172(113) 1.18 MODEL HAS NOT REACHED CENTERLINE  
 M 2247(113) 1.18 MODEL HAS NOT REACHED CENTERLINE  
 T 2344(113) 2.25 MODEL HAS NOT REACHED CENTERLINE  
 M 2206(113) 2.25 MODEL HAS NOT REACHED CENTERLINE  
 S 4174(113) 2.28 MODEL HAS NOT REACHED CENTERLINE

INJECT TIME = 2.40

T 2345(113) 3.35 DATA NOT YET VALID

S 4174(113) 3.35 DATA NOT YET VALID

M 2206(113) 3.35 DATA NOT YET VALID

T 2345(113) 4.43 1.04E-03 .0317 1.331E-03 .0386 1.295E-03 .0375 9.098E-04

S 4174(113) 4.43 1.04E-03 .0316 1.331E-03 .0384 1.295E-03 .0374 9.060E-04

M 2206(113) 4.43 1.04E-03 .0316 1.331E-03 .0384 1.295E-03 .0374 9.060E-04

T 2345(113) 4.46 1.04E-03 .0316 1.331E-03 .0384 1.295E-03 .0374 9.060E-04

S 4174(113) 4.46 1.04E-03 .0316 1.331E-03 .0384 1.295E-03 .0374 9.060E-04

M 2206(113) 4.46 1.04E-03 .0316 1.331E-03 .0384 1.295E-03 .0374 9.060E-04

T 2345(113) 5.53 1.04E-03 .0316 1.331E-03 .0384 1.295E-03 .0374 9.060E-04

S 4174(113) 5.53 1.04E-03 .0316 1.331E-03 .0384 1.295E-03 .0374 9.060E-04

M 2206(113) 5.53 1.04E-03 .0316 1.331E-03 .0384 1.295E-03 .0374 9.060E-04

T 2345(113) 5.53 1.04E-03 .0316 1.331E-03 .0384 1.295E-03 .0374 9.060E-04

S 4174(113) 5.53 1.04E-03 .0316 1.331E-03 .0384 1.295E-03 .0374 9.060E-04

M 2206(113) 5.53 1.04E-03 .0316 1.331E-03 .0384 1.295E-03 .0374 9.060E-04

T 2345(113) 6.61 1.04E-03 .0316 1.331E-03 .0384 1.295E-03 .0374 9.060E-04

S 4174(113) 6.61 1.04E-03 .0316 1.331E-03 .0384 1.295E-03 .0374 9.060E-04

M 2206(113) 6.61 1.04E-03 .0316 1.331E-03 .0384 1.295E-03 .0374 9.060E-04

T 2345(113) 7.71 1.04E-03 .0316 1.331E-03 .0384 1.295E-03 .0374 9.060E-04

S 4174(113) 7.71 1.04E-03 .0316 1.331E-03 .0384 1.295E-03 .0374 9.060E-04

M 2206(113) 7.71 1.04E-03 .0316 1.331E-03 .0384 1.295E-03 .0374 9.060E-04

T 2345(113) 8.79 1.04E-03 .0316 1.331E-03 .0384 1.295E-03 .0374 9.060E-04

S 4174(113) 8.79 1.04E-03 .0316 1.331E-03 .0384 1.295E-03 .0374 9.060E-04

M 2206(113) 8.79 1.04E-03 .0316 1.331E-03 .0384 1.295E-03 .0374 9.060E-04

T 2345(113) 9.86 1.04E-03 .0316 1.331E-03 .0384 1.295E-03 .0374 9.060E-04

S 4174(113) 9.86 1.04E-03 .0316 1.331E-03 .0384 1.295E-03 .0374 9.060E-04

M 2206(113) 9.86 1.04E-03 .0316 1.331E-03 .0384 1.295E-03 .0374 9.060E-04

568

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7/11/73

AECD(ARO,INC.) ARNOLD AFB, TENNESSEE  
VON KARMAN GAS DYNAMICS FACILITY  
50 INCH HYPERSONIC TUNNEL B

WASA-KI ORRYTER HEATING

VAZAG

[illegible]

T-INF	D-INF	Q-INF	V-INF	RMO-INF	MU-INF	RF/FT	MREF	STREF
(DEG M)	(PSIA)	(PSIA)	(F/SEC)	(SLUGS/FT <sup>3</sup> )	(LH-SEC/FT <sup>2</sup> )	(FT-L)	(M-0.175FT)	(M-0.175FT)
93.6	-044	1.979	3748	7.537E-05	7.537E-08	1.589E 06	3.450E-02	2.891E-02

ROLL NO	PAINT (GPM (DEG F)	INITIAL TEMP (DEG F)	SQUARE FOOT	TRAR(TO)	BETA(TO)
CAWFA					
104(Y)	8214				
STRE(S)	7212	113	0.0475	4.402E-02	4.0426E-02

[illegible]

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7/11/73

# NASA-HI ORBITER HEATING

VA289

AFDC(ARO, INC.) ANNOUNCED AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL R

GROUP CONFIG MODEL MAJ NO PO(PSIA) TO(PSIA) ALPHA-SECTOR ALPHA-PREREND ROLL-MODEL YAW  
 1A0 2 OPERTR S 7.98 426.8 1289 30.05 -.05 -30.00 -180.00 -.00

T-INF P-INF U-INF V-INF RHO-INF MU-INF HF/FT MREF SREF  
 (DEG R) (PSIA) (FT/SEC) (SLUGS/FT<sup>3</sup>) (LR-SEC/FT<sup>2</sup>) (FT-1) (RZ-.0175FT) (RZ-.0175FT)  
 93.0 .144 1.941 37.8 3.073F-05 7.556E-04 1.992E 04 3.451E-02 2.890E-02

CANSEA ROLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHOKCCK) TRAN(10) BETA(10)  
 TOP(1) 8214  
 VICE(S) 7612  
 MOTTCH(R) 8527

PTC NO	TIME RELTIME	M(TO)	M(TO)/MREF	M(.910)	M(.910)/MREF	M(.9130)	M(.9130)/MREF	ST(10)
T 2364(113)	19.62	4.472E-04	.0130	5.465E-04	.0158	5.319E-04	.0154	3.732E-04
M 2364(113)	19.62	4.472E-04	.0130	5.465E-04	.0158	5.319E-04	.0154	3.732E-04
S 2364(113)	19.65	4.472E-04	.0130	5.465E-04	.0158	5.319E-04	.0154	3.732E-04
T 2365(113)	20.72	4.363E-04	.0126	5.307E-04	.0154	5.165E-04	.0150	3.624E-04
M 2365(113)	20.72	4.363E-04	.0126	5.307E-04	.0154	5.165E-04	.0150	3.624E-04
S 2365(113)	20.72	4.363E-04	.0126	5.307E-04	.0154	5.165E-04	.0150	3.624E-04
T 2366(113)	21.50	4.246E-04	.0123	5.163E-04	.0150	5.027E-04	.0146	3.526E-04
M 2366(113)	21.50	4.246E-04	.0123	5.163E-04	.0150	5.027E-04	.0146	3.526E-04
S 2366(113)	21.50	4.246E-04	.0123	5.163E-04	.0150	5.027E-04	.0146	3.526E-04
T 2367(113)	22.59	4.139E-04	.0120	5.035E-04	.0146	4.900E-04	.0142	3.436E-04
M 2367(113)	22.59	4.139E-04	.0120	5.035E-04	.0146	4.900E-04	.0142	3.436E-04
S 2367(113)	22.59	4.139E-04	.0120	5.035E-04	.0146	4.900E-04	.0142	3.436E-04
T 2368(113)	23.63	4.037E-04	.0117	4.911E-04	.0142	4.779E-04	.0138	3.352E-04
M 2368(113)	23.63	4.037E-04	.0117	4.911E-04	.0142	4.779E-04	.0138	3.352E-04
S 2368(113)	23.63	4.037E-04	.0117	4.911E-04	.0142	4.779E-04	.0138	3.352E-04
T 2369(113)	24.65	4.034E-04	.0117	4.908E-04	.0142	4.777E-04	.0138	3.350E-04
M 2369(113)	24.65	4.034E-04	.0117	4.908E-04	.0142	4.777E-04	.0138	3.350E-04
S 2369(113)	24.65	4.034E-04	.0117	4.908E-04	.0142	4.777E-04	.0138	3.350E-04

MODEL HAS LEFT CENTRAL LINE

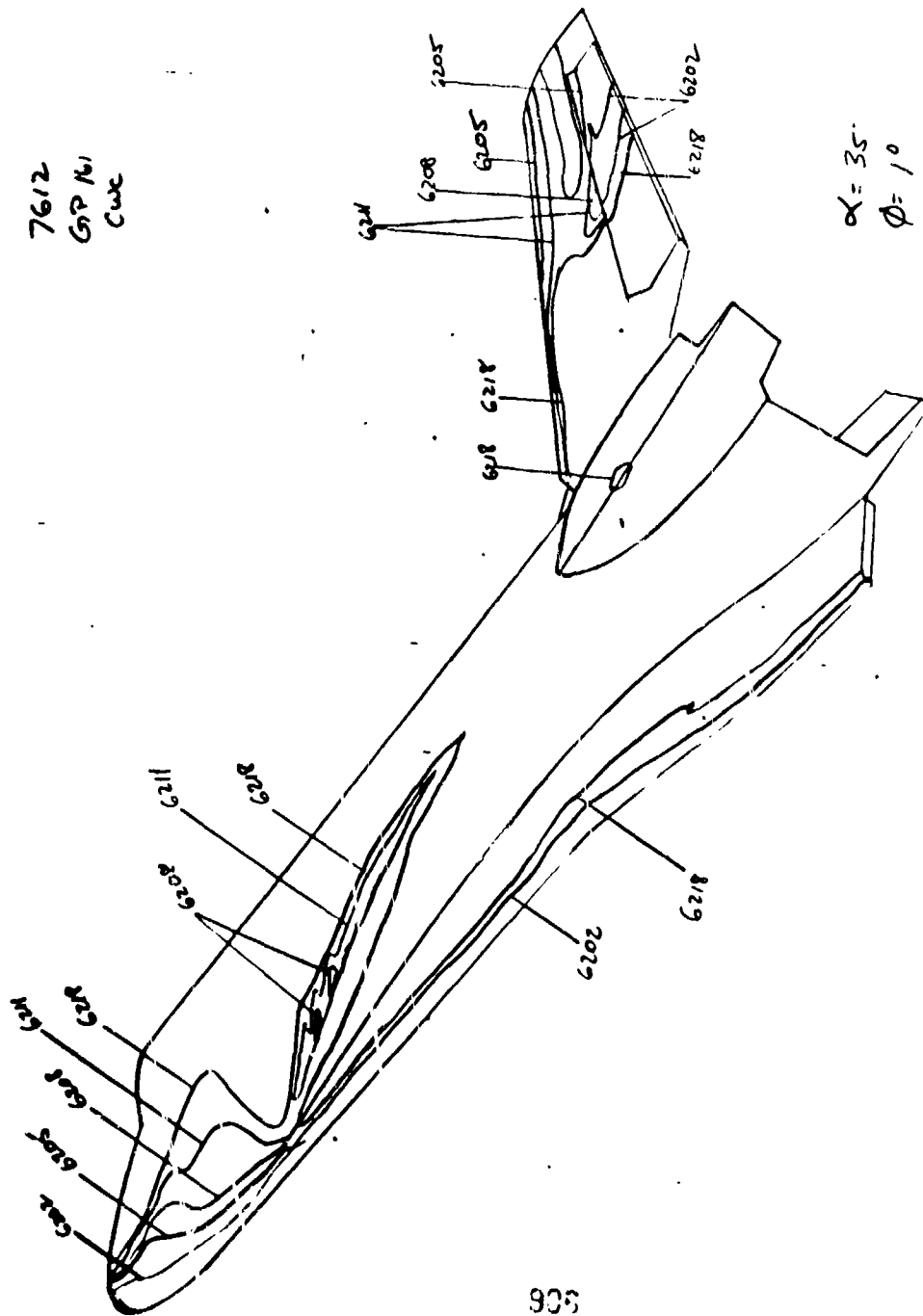
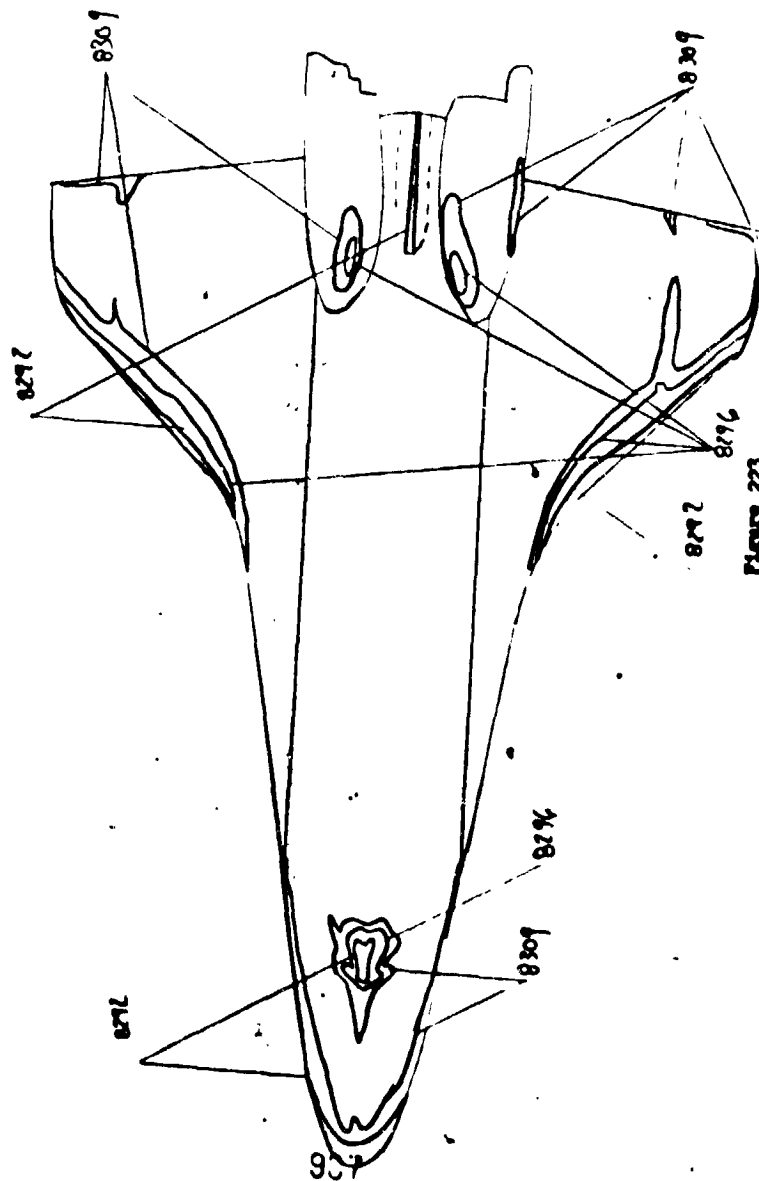


Figure 222



Group 161  
8527  
nd

$$\alpha = 35$$


6A289

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7/11/73

2/11/73

MASSACHUSETTS DEPARTMENT OF REVENUE

6A289

AEUC(ARQ,INC.) ARNOLD AFS, TENNESSEE  
VON KAMMAN GAS DYNAMICS FACILITY  
50 INCH HYPERSONIC TUNNEL R

50 12CH 4YHFHSCNIC TLNCEL R

GROUP	CONFID	MODEL	MACH	MC	PO(PSTA)	TO(DEL R)	ALPHA-MODEL	ALPHA-DREHNO	ROLL-MODEL	YAW
141	2	CGHITEM 5	7.48	425.9	1247	35.02	-5.04	-30.00	-101.80	1.03

T-Inf	D-Inf	O-Inf	V-Inf	BMI-Inf	MU-Inf	UF/Yr	MWF	SWEF
(PSIA)	(PSIA)	(SEC)	(SLUSG/FT <sup>3</sup> )	(LH-SEC/FT <sup>2</sup> )	(FT-I)	--	IN--0.0175FI--	MS--0.015EII
98.6	1.44	1.477	37.04	7.54E-04	1.93E 0A	3.447E-02	2.889E-02	

CELL NO	PAINT TEMP (UFG F)	INITIAL TEMP (DEG F)	SQUARE ROOT (RHOMUXXK)	BETA(TO)
8214	113	20	0.0475	0
TOP (T)				
TEMP(S)				

[illegible][illegible]

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
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INDEX	FILE #	DATE	TIME	STATUS	REMARKS
1	271013	3.23		DATA NOT YET VALID	
2	4201013	3.23		DATA NOT YET VALID	
3	5201013	3.23		DATA NOT YET VALID	

[illegible]

0.349	1.277E-03	0.370	9.158E-04
0.348	1.272E-03	0.369	9.124E-04
0.348	1.272E-03	0.369	9.124E-04
0.334	1.095E-03	0.317	7.851E-04
0.334	1.095E-03	0.317	7.851E-04
0.324	1.095E-03	0.317	7.851E-04
0.324	1.095E-03	0.317	7.851E-04
0.297	9.760E-04	0.283	6.999E-04
0.297	9.760E-04	0.283	6.999E-04
0.297	9.731E-04	0.282	6.981E-04
0.270	8.471E-04	0.267	6.362E-04
0.270	8.471E-04	0.267	6.362E-04
0.270	8.471E-04	0.267	6.362E-04
0.250	8.202E-04	0.238	5.874E-04
0.250	8.202E-04	0.238	5.874E-04
0.249	8.108E-04	0.237	5.871E-04
0.233	7.664E-04	0.222	5.494E-04
0.233	7.664E-04	0.222	5.494E-04

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AFDCIAR(ON-INC.) AMNOLU AFS, TENNESSEE  
 V-10 KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL R

NASA-WI ORBITER HEATING

VA290

GROUP CONFIG MODEL MACH NO PO(PSIA) T(IDEG R) ALPHA-MODEL ALPHA-SECTION ALPHA-PREBEND ROLL-MODEL YAW  
 141 2 ORBITER S 7.96 426.8 1287 35.02 -5.04 -30.00 -181.80 1.03

T-INF P-INF Q-INF V-INF MU-INF MU-INF DE/FT MREF STREF  
 (DEG R) (PSIA) (PSIA) (T/SEC) (SLUGS/FT<sup>2</sup>) (LH-SEC/FT<sup>2</sup>) (FT-1) (R<sub>a</sub> .017551) (R<sub>a</sub> .017551)  
 93.7 .044 1.941 1764 7.041E-05 7.541E-06 1.694E 06 3.450E-02 2.844E-02

CAPCHA WOLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHOCACK) THR(10) BETA(10)  
 TOP(1) R21R A0 .0475 4.419E-02 4.0598E-02  
 TOP(15) 7212  
 WITCH(8) 8527

PIC NO TIME DELTIME HITO)/HREF M(,G10) M(,G10)/HREF M(,G2310) M(,G2310)/HREF ST(10)

M	2297(113)	0.56	0.51	6.610E-04	.0192	6.044E-04	.0213	7.653E-04	.0222	5.487E-04
T	2298(113)	10.54	9.59	6.222E-04	.0181	7.579E-04	.0220	7.211E-04	.0209	5.170E-04
N	526(113)	10.54	9.59	6.222E-04	.0181	7.579E-04	.0220	7.211E-04	.0208	5.170E-04
M	2294(113)	10.54	9.59	6.222E-04	.0181	7.579E-04	.0220	7.211E-04	.0209	5.170E-04
T	2294(113)	12.01	10.64	5.905E-04	.0171	7.187E-04	.0208	6.837E-04	.0198	4.903E-04
M	2294(113)	12.01	10.64	5.905E-04	.0171	7.187E-04	.0208	6.837E-04	.0198	4.903E-04
S	2294(113)	12.01	10.64	5.905E-04	.0171	7.187E-04	.0208	6.837E-04	.0198	4.903E-04
M	2294(113)	13.09	11.74	5.674E-04	.0163	6.844E-04	.0198	6.516E-04	.0189	4.670E-04
T	2294(113)	13.12	11.77	5.674E-04	.0163	6.844E-04	.0198	6.516E-04	.0189	4.670E-04
S	2294(113)	13.12	11.77	5.674E-04	.0163	6.844E-04	.0198	6.516E-04	.0189	4.670E-04
T	2294(113)	14.09	12.84	5.371E-04	.0154	6.544E-04	.0190	6.231E-04	.0181	4.465E-04
T	2294(113)	14.19	12.84	5.371E-04	.0154	6.544E-04	.0190	6.231E-04	.0181	4.465E-04
M	2294(113)	14.19	12.84	5.371E-04	.0154	6.544E-04	.0190	6.231E-04	.0181	4.465E-04
T	2294(113)	15.27	13.92	5.169E-04	.0150	6.291E-04	.0182	5.985E-04	.0173	4.291E-04
S	2294(113)	15.27	13.92	5.169E-04	.0150	6.291E-04	.0182	5.985E-04	.0173	4.291E-04
T	2294(113)	16.31	14.99	4.905E-04	.0144	6.041E-04	.0176	5.766E-04	.0167	4.131E-04
M	2294(113)	16.31	14.99	4.905E-04	.0144	6.041E-04	.0176	5.766E-04	.0167	4.131E-04
T	2294(113)	17.02	15.02	4.697E-04	.0144	5.844E-04	.0175	5.570E-04	.0161	3.992E-04
S	2294(113)	17.02	15.02	4.697E-04	.0144	5.844E-04	.0175	5.570E-04	.0161	3.992E-04
T	2294(113)	17.05	15.13	4.697E-04	.0139	5.844E-04	.0170	5.565E-04	.0161	3.988E-04
M	2294(113)	17.05	15.13	4.697E-04	.0139	5.844E-04	.0170	5.565E-04	.0161	3.988E-04
T	2294(113)	17.17	17.17	4.697E-04	.0135	5.664E-04	.0164	5.384E-04	.0156	3.862E-04
S	2294(113)	17.17	17.17	4.697E-04	.0135	5.664E-04	.0164	5.384E-04	.0156	3.862E-04
T	2294(113)	18.22	17.17	4.697E-04	.0135	5.664E-04	.0164	5.384E-04	.0156	3.862E-04
M	2294(113)	18.22	17.17	4.697E-04	.0135	5.664E-04	.0164	5.384E-04	.0156	3.862E-04

572

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 • UNCLASSIFIED •  
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578



Group 162  
8527  
1005

452d  
 $\alpha = 30^\circ$   
 $\phi = 0^\circ$

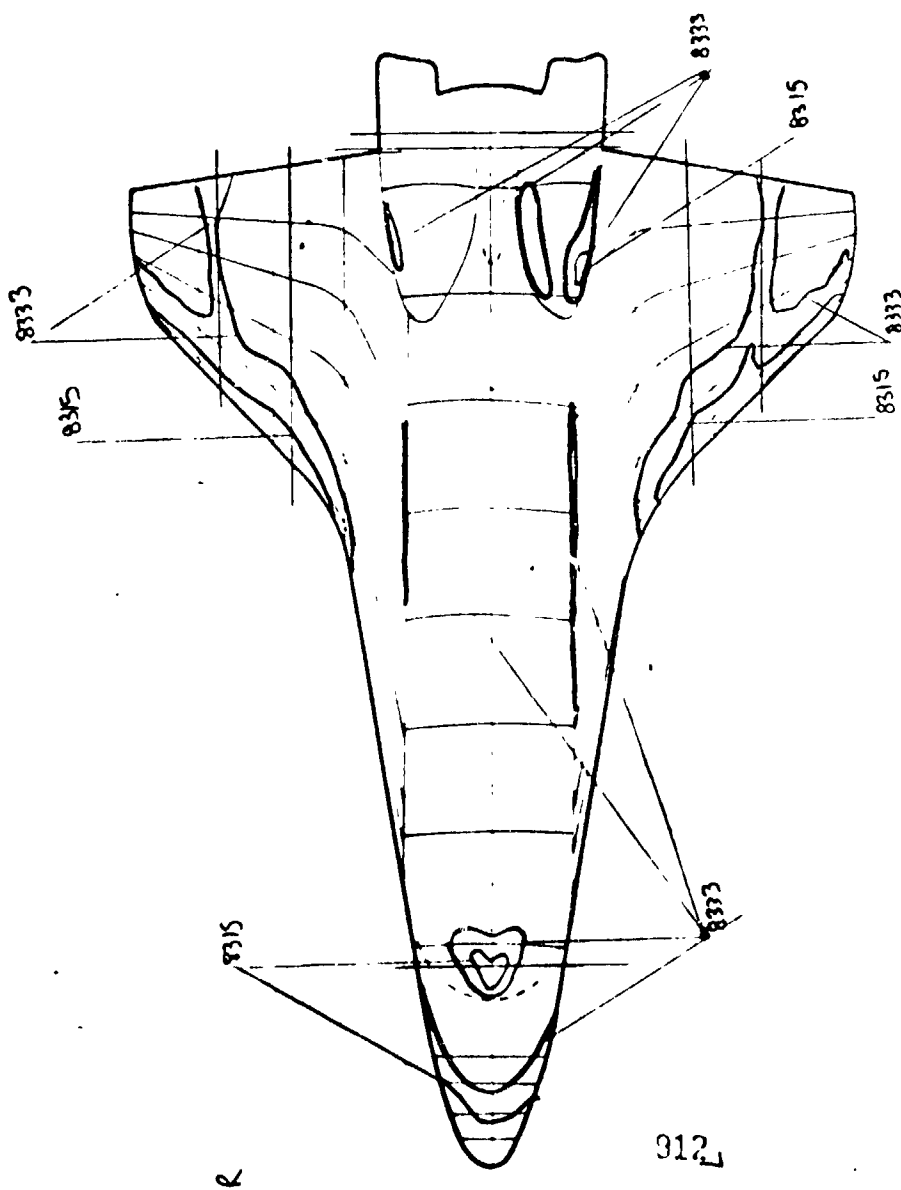


Figure 225

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 \* UNCLASSIFIED \*  
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 7/11/73

NASA-HI ORBITER PEATING AEDC(ARO, INC.) ARNOLD AFS, TENNESSEE  
 VON KAPLAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL R  
 VA299

GR JP CONFIG MODEL MACH NO PO(PSTA) TO(DEG R) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREBEND ROLL-MODEL YAW  
 107 2 ORBITER S 7.98 424.8 1227 30.00 0 -30.00 -180.00 -0.00  
 INF P-INF 0-INF 0-INF MU-INF MU-INF HE/FT HREF STREF  
 (DEG R) (PSTA) (FT/SEC) (SLUGS/FT<sup>3</sup>) (LP-SEC/FT<sup>2</sup>) (FT-1) (R= .0175FI) (R= .0175FI)  
 93.7 .044 1.972 3785 3.040E-05 7.545E-08 1.986E 06 3.443E-02 2.894E-02  
 CAMECA HOLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHUACIK) TRAR(TO) BETA(TO)  
 TOP(T) 821P  
 NITE(S) 7212 113 M2 .0475 0 0  
 MOTTOM(B) 8527

PIC NO TIME DELTIME H(TO) H(TO)/HREF H(-9TO) H(-9TO)/HREF H( .912TO) H( .912TO)/HREF ST(TO)  
 M 8312(113) 1.15 MODEL HAS NOT REACHED CENTERLINE  
 T 2394(113) 3.35 DATA NOT YET VALID  
 S 6224(113) 4.43 1.042E-13 .0300 1.255E-03 .0365 1.222E-03 .0355 8.605E-04  
 S 6225(113) 4.43 1.042E-13 .0300 1.255E-03 .0365 1.222E-03 .0355 8.605E-04  
 M 2315(113) 4.43 1.042E-13 .0300 1.255E-03 .0365 1.222E-03 .0355 8.605E-04  
 T 2394(113) 5.51 4.14 8.845E-04 .0258 1.042E-03 .0314 1.052E-03 .0306 7.408E-04  
 M 8314(113) 5.51 4.14 8.845E-04 .0258 1.042E-03 .0314 1.052E-03 .0306 7.408E-04  
 S 6224(113) 5.53 4.18 8.845E-04 .0257 1.042E-03 .0313 1.049E-03 .0305 7.386E-04  
 T 2397(113) 6.61 5.26 7.900E-04 .0229 9.604E-04 .0279 9.357E-04 .0272 6.584E-04  
 S 6227(113) 6.61 5.26 7.900E-04 .0229 9.604E-04 .0279 9.357E-04 .0272 6.584E-04  
 M 2317(113) 6.61 5.26 7.900E-04 .0229 9.604E-04 .0279 9.357E-04 .0272 6.584E-04  
 T 2394(113) 7.68 6.33 7.157E-04 .0209 8.752E-04 .0254 8.526E-04 .0248 5.998E-04  
 M 2317(113) 7.68 6.33 7.157E-04 .0209 8.752E-04 .0254 8.526E-04 .0248 5.998E-04  
 S 6227(113) 7.71 6.34 7.143E-04 .0209 8.752E-04 .0254 8.526E-04 .0247 5.987E-04  
 T 2394(113) 8.79 7.44 4.643E-04 .0193 8.752E-04 .0235 7.869E-04 .0229 5.539E-04  
 S 6224(113) 8.79 7.44 4.643E-04 .0193 8.752E-04 .0235 7.869E-04 .0229 5.539E-04  
 M 2319(113) 8.79 7.44 4.643E-04 .0193 8.752E-04 .0235 7.869E-04 .0229 5.539E-04  
 T 2400(113) 9.85 8.51 4.249E-04 .0180 7.552E-04 .0219 7.355E-04 .0213 5.171E-04  
 M 8320(113) 9.85 8.51 4.249E-04 .0180 7.552E-04 .0219 7.355E-04 .0213 5.171E-04

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AEOCIAWO, INC.) ARNOLD AFS, TENNESSEE  
VON KARMAN GAS DYNAMICS FACILITY  
50 INCH HYPERSONIC TUNNEL H

**NASA-HI ORBITER FEATING**

VAZAG

GROUP	CONFIG	MODEL	WACH NO	POI(SIA)	TO(DLG R)	ALPHA-MODEL	ALPHA-SECTOR	ALPHA-PREREND	ROLL-MODEL	YAW
142	2	ORBITER S	7.98	425.4	1287	37.00	0	-30.00	-180.00	-0.00

T-INF	P-INF	Q-INF	V-INF	PMO-INF	W-INF	DF/FT	WREF	STREF
(DEG)	(PSIA)	(FT/SEC)	(SLUGS/FT <sup>3</sup> )	(LB-SEC/FT <sup>2</sup> )	(FT-1)	(H <sub>2</sub> -0.175FI)	(H <sub>2</sub> -0.175FI)	(H <sub>2</sub> -0.175FI)
93.7	0.44	1.074	37.95	7.445E-05	1.989E 03	3.445E-02	7.892E-02	7.892E-02

WOLL NO	PAINT TEMP (DEG F)	INITIAL TEMP (DEG F)	SQUARE FOOT	TRAR(TO)	BETA(TO)
8214					
7212	113	#2		4.159E-02	3.8137E-02
5227			.0475		

	PIC NO.	TIME RELATIVE	H(10)	H(10)/HREF	H(910)	M(910)/HREF	M(910)/HREF	M(91210)	H(91210)/HREF	ST(10)
S	5230(113)	9.59	6.200F-04	.0199	7.539E-04	.0219	7.344E-04	.0213	5.166E-04	
S	5231(113)	10.54	5.859F-04	.0179	7.115E-04	.0207	6.930E-04	.0201	4.872E-04	
I	2401(113)	10.56	5.859F-04	.0179	7.105E-04	.0206	6.921E-04	.0201	4.866F-04	
I	2401(113)	10.54	5.859F-04	.0179	7.105E-04	.0206	6.921E-04	.0201	4.866E-04	
T	2402(113)	12.04	5.541F-04	.0161	6.739E-04	.0196	6.563E-04	.0191	4.615E-04	
S	5232(113)	12.04	5.541F-04	.0161	6.739E-04	.0196	6.563E-04	.0191	4.615E-04	
S	5232(113)	12.04	5.541F-04	.0161	6.739E-04	.0196	6.563E-04	.0191	4.615E-04	
T	2403(113)	13.12	5.211F-04	.0151	6.422E-04	.0186	6.256E-04	.0182	4.397E-04	
M	5233(113)	13.14	5.211F-04	.0151	6.422E-04	.0186	6.256E-04	.0182	4.397E-04	
S	5234(113)	14.19	5.035F-04	.0147	6.147E-04	.0178	5.949E-04	.0174	4.209F-04	
T	2404(113)	14.22	5.035F-04	.0147	6.147E-04	.0178	5.949E-04	.0174	4.209E-04	
T	2404(113)	14.22	5.035F-04	.0147	6.147E-04	.0178	5.949E-04	.0174	4.209E-04	
T	2405(113)	15.27	4.841F-04	.0141	5.890E-04	.0171	5.747F-04	.0167	4.049F-04	
S	5235(113)	15.27	4.841F-04	.0141	5.890E-04	.0171	5.747F-04	.0167	4.049F-04	
M	5236(113)	15.29	4.841F-04	.0141	5.890E-04	.0171	5.747F-04	.0167	4.049F-04	
T	2406(113)	16.37	4.674F-04	.0136	5.642E-04	.0165	5.537E-04	.0161	3.892E-04	
T	2406(113)	16.37	4.674F-04	.0136	5.642E-04	.0165	5.537E-04	.0161	3.892E-04	
T	2407(113)	16.39	4.674F-04	.0136	5.642E-04	.0165	5.537E-04	.0161	3.892E-04	
T	2407(113)	16.39	4.674F-04	.0136	5.642E-04	.0165	5.537E-04	.0161	3.892E-04	
M	5237(113)	17.45	4.515F-04	.0131	5.491E-04	.0159	5.344E-04	.0155	3.759E-04	
T	2408(113)	17.47	4.515F-04	.0131	5.491E-04	.0159	5.344E-04	.0155	3.759E-04	
T	2408(113)	17.47	4.515F-04	.0131	5.491E-04	.0159	5.344E-04	.0155	3.759E-04	
T	2409(113)	18.55	4.349F-04	.0127	5.312E-04	.0154	5.174F-04	.0150	3.638F-04	
T	2409(113)	18.55	4.349F-04	.0127	5.312E-04	.0154	5.174F-04	.0150	3.638F-04	
T	2410(113)	19.25	4.349F-04	.0127	5.312E-04	.0154	5.174F-04	.0150	3.638F-04	
T	2410(113)	19.25	4.349F-04	.0127	5.312E-04	.0154	5.174F-04	.0150	3.638F-04	

575

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NASA-RI ORBITER HEATING  
 AEDC(ARO-TAC) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL R

LA249

GROUP CONFIG MODEL MACH NO P0(P5IA) T0( DEG R) ALPHA-MODEL ALPHA-SECTION ALPHA-PREBEND ROLL-MODEL YAW  
 162 2 ORBITER S 7.98 425.7 1287 3n.00 0 0 -30.00 -180.00 -.00

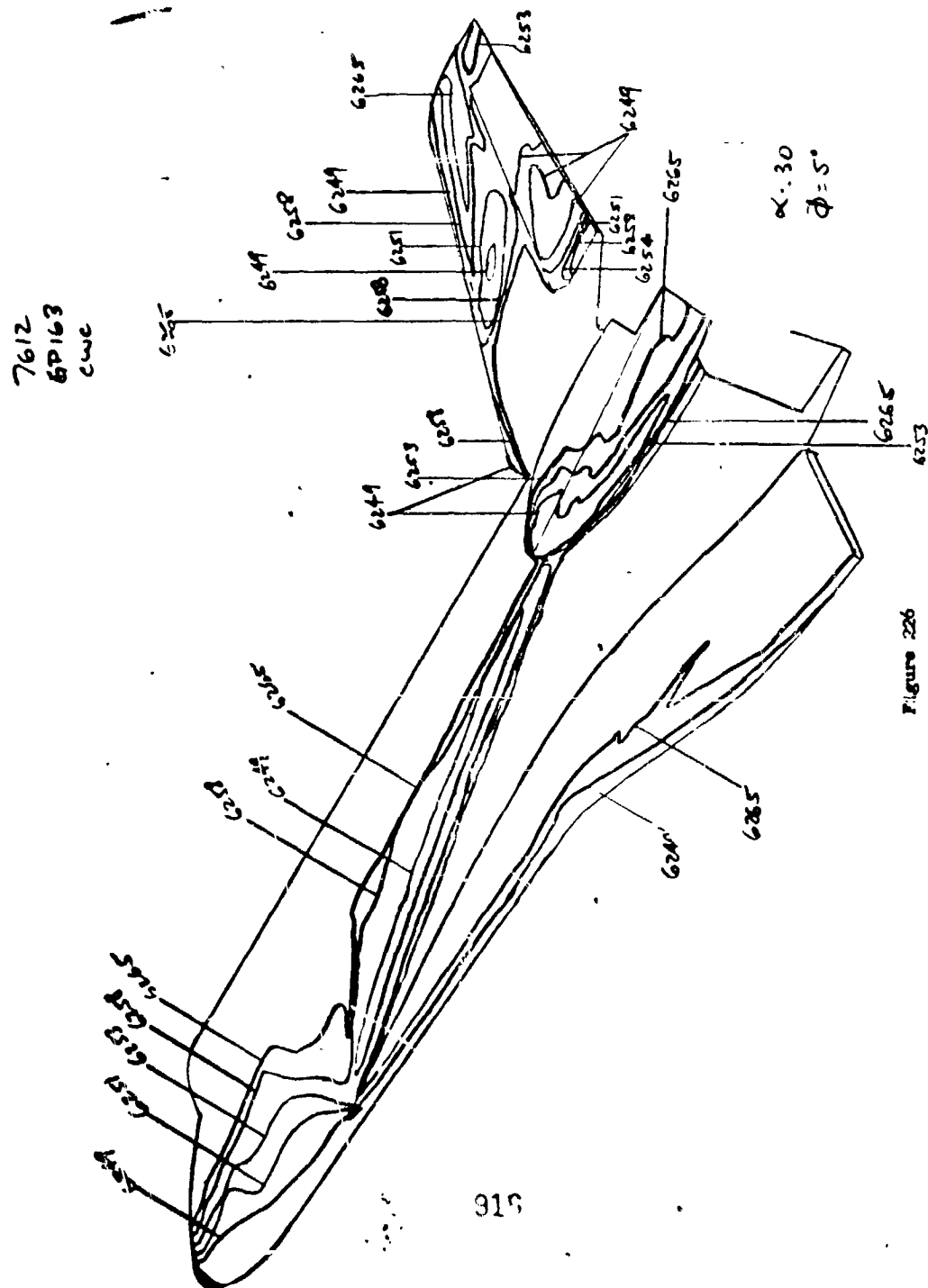
T-INF P-TNF Q-TNF V-TNF RMQ-INF MU-INF RE/FT HREF STREF  
 (DEG R) (PSIA) (FT/SEC) (SLUGS/FT3) (L4-SEC/FT3) (F1-1) (R2-0175F1) (R2-0175F1)  
 93.7 .044 1.976 3765 3.988F-05 7.545E-08 1.491E 05 3.446E-02 2.891E-02

CAMERA ROLL NO PAINT IFMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RMQXCK) TRAR(TO) BETA(TO)  
 TOPITI 8218  
 SICTS 7212  
 BOTTCM(81) 8527  
 .0475 4.159E-02 3.8137E-02

PIC NO TIME DELTIME H(TO) HREF H(TO)/HREF H(-91210)/HREF H(-91210) HI(-91210)/HREF ST(TO)

I 2409(113)	19.62	19.27	4.238E-04	.0123	5.153E-04	.0150	5.020E-04	.0146	3.527E-04
S 4239(113)	19.62	19.27	4.238E-04	.0123	5.153E-04	.0150	5.020E-04	.0146	3.527E-04
M 8329(113)	19.62	19.27	4.238E-04	.0123	5.153E-04	.0150	5.020E-04	.0146	3.527E-04
I 2410(113)	20.70	19.35	4.118E-04	.0119	5.004E-04	.0145	4.878E-04	.0142	3.427E-04
S 6240(113)	20.70	19.35	4.118E-04	.0119	5.004E-04	.0145	4.878E-04	.0142	3.427E-04
M 8330(113)	20.70	19.35	4.118E-04	.0119	5.004E-04	.0145	4.878E-04	.0142	3.427E-04
I 2411(113)	21.78	20.43	4.008E-04	.0114	4.874E-04	.0141	4.748E-04	.0138	3.335E-04
S 6241(113)	21.78	20.43	4.008E-04	.0114	4.874E-04	.0141	4.748E-04	.0138	3.335E-04
M 8331(113)	21.78	20.43	4.008E-04	.0114	4.874E-04	.0141	4.748E-04	.0138	3.335E-04
I 2412(113)	22.65	21.59	4.008E-04	.0113	4.751E-04	.0139	4.624E-04	.0134	3.250E-04
S 6242(113)	22.65	21.59	4.008E-04	.0113	4.751E-04	.0139	4.624E-04	.0134	3.250E-04
M 8332(113)	22.65	21.59	4.008E-04	.0113	4.751E-04	.0139	4.624E-04	.0134	3.250E-04
I 2413(113)	23.55	22.69	3.810E-04	.0111	4.633E-04	.0134	4.513E-04	.0131	3.172E-04
S 6243(113)	23.55	22.69	3.810E-04	.0111	4.633E-04	.0134	4.513E-04	.0131	3.172E-04
M 8333(113)	23.55	22.69	3.810E-04	.0111	4.633E-04	.0134	4.513E-04	.0131	3.172E-04
MODEL WAS LEFT CENTERLINE									
I 2414(113)	24.13	23.69	3.723E-04	.0104	4.527E-04	.0131	4.410E-04	.0128	3.096E-04
S 6244(113)	24.13	23.69	3.723E-04	.0104	4.527E-04	.0131	4.410E-04	.0128	3.096E-04
M 8334(113)	24.13	23.69	3.723E-04	.0104	4.527E-04	.0131	4.410E-04	.0128	3.096E-04
I 2415(113)	25.03	24.76	3.641E-04	.0106	4.427E-04	.0128	4.311E-04	.0125	3.028E-04
S 6245(113)	25.03	24.76	3.641E-04	.0106	4.427E-04	.0128	4.311E-04	.0125	3.028E-04
M 8335(113)	25.03	24.76	3.641E-04	.0106	4.427E-04	.0128	4.311E-04	.0125	3.028E-04

578



Group 163  
8577  
105

$\alpha = 30$   
 $\beta = 5$

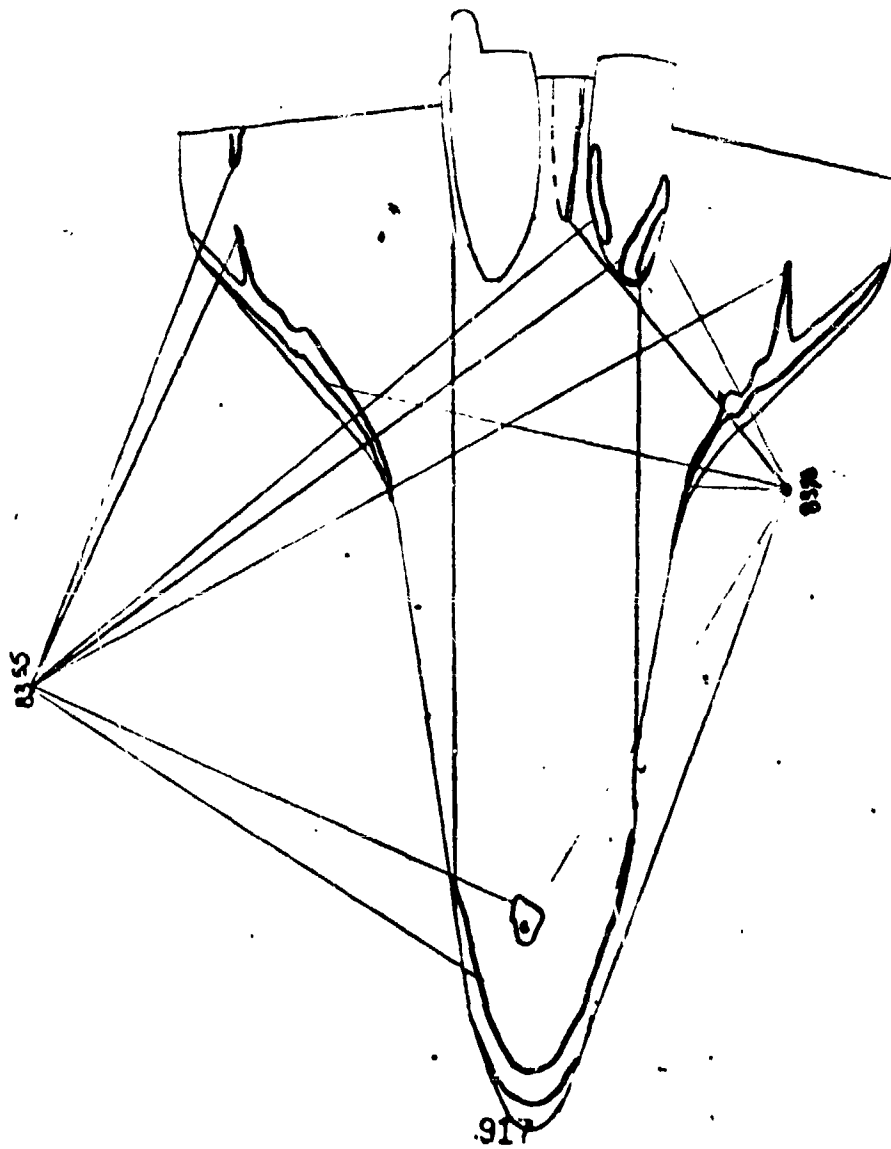


Figure 227

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NASA-PI ORBITER HEATING

VA209

AEDC(ARO,INC.) ARNOLD AFS, TENNESSEE  
VON KARMAN GAS DYNAMICS FACILITY  
50 INCH HYPERSONIC TUNNEL B

GROUP CONFIG MODEL MACH NO PO(PSIA) TO(100 R) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREBEND ROLL-MODEL YAW  
163 2 ORBITER S 7.98 425.2 1287 30.07 -4.44 -30.03 -189.90 5.00  
T-INF P-INF Q-INF V-INF RHQ-INF MU-INF RF/FT MREF STREF  
(DEG R) (PSIA) (FT/SFC) (SLUGS/FT3) (LR-SEC/FT2) (FT-1) (R=.0175FT) (R=.0175FT)  
93.7 .044 1.973 3705 3.965E-05 7.543E-08 1.999E 06 3.444E-02 2.892E-02  
CAMERA ROLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHCXCK) TBAR(10) BETA(10)  
TOP(7) 8218  
SIDE(S) 7212 131 A2 .0486 0 0  
HOTCH(8) 8527

PIC NO TIME DELTME H(TO) H(TO)/MREF H(.9TO) H(.9TO)/MREF H(.9TO) M(.9TO) MREF ST(10)

T 2416(131) 1.15 MODEL HAS NOT REACHED CENTERLINE  
S 6746(131) 1.15 MODEL HAS NOT REACHED CENTERLINE  
M 8336(131) 1.15 MODEL HAS NOT REACHED CENTERLINE  
M 8337(131) 2.23 MODEL HAS NOT REACHED CENTERLINE  
T 2417(131) 2.25 MODEL HAS NOT REACHED CENTERLINE  
S 6247(131) 2.25 MODEL HAS NOT REACHED CENTERLINE  
INJECT TIME = 2.41

T 2418(131) 3.23 DATA NOT YET VALID

S 6248(131) 3.23 DATA NOT YET VALID

M 8338(131) 3.23 DATA NOT YET VALID

T 2419(131) 4.41 3.04 1.709E-03 .0496 2.091E-03 .0607 2.034E-03 .0590 1.422E-03

S 6249(131) 4.41 3.04 1.709E-03 .0496 2.091E-03 .0607 2.034E-03 .0590 1.422E-03

M 8339(131) 4.41 3.04 1.709E-03 .0496 2.091E-03 .0607 2.034E-03 .0590 1.422E-03

T 2420(131) 5.48 4.14 1.470E-03 .0427 1.798E-03 .0522 1.749E-03 .0507 1.222E-03

M 8340(131) 5.48 4.14 1.470E-03 .0427 1.798E-03 .0522 1.749E-03 .0507 1.222E-03

S 6250(131) 5.51 4.16 1.465E-03 .0425 1.793E-03 .0520 1.744E-03 .0506 1.219E-03

M 8341(131) 6.58 5.21 1.309E-03 .0380 1.402E-03 .0445 1.554E-03 .0452 1.088E-03

T 2421(131) 6.58 5.23 1.306E-03 .0379 1.598E-03 .0444 1.554E-03 .0451 1.086E-03

S 6251(131) 6.58 5.23 1.306E-03 .0379 1.598E-03 .0444 1.554E-03 .0451 1.086E-03

M 8342(131) 7.66 6.31 1.190E-03 .0345 1.455E-03 .0422 1.415E-03 .0411 9.889E-04

T 2422(131) 7.66 6.31 1.190E-03 .0345 1.455E-03 .0422 1.415E-03 .0411 9.889E-04

S 6252(131) 7.66 6.31 1.190E-03 .0345 1.455E-03 .0422 1.415E-03 .0411 9.889E-04

M 8343(131) 8.74 7.39 1.099E-03 .0319 1.345E-03 .0390 1.308E-03 .0380 9.138E-04

T 2423(131) 8.74 7.39 1.099E-03 .0319 1.345E-03 .0390 1.308E-03 .0380 9.138E-04

S 6253(131) 8.74 7.39 1.099E-03 .0319 1.345E-03 .0390 1.308E-03 .0380 9.138E-04

M 8344(131) 9.81 8.46 1.027E-03 .0298 1.257E-03 .0365 1.222E-03 .0355 8.538E-04

T 2424(131) 9.81 8.46 1.027E-03 .0298 1.257E-03 .0365 1.222E-03 .0355 8.538E-04

S 6254(131) 9.81 8.46 1.027E-03 .0298 1.257E-03 .0365 1.222E-03 .0355 8.538E-04

M 8345(131) 9.81 8.46 1.027E-03 .0298 1.257E-03 .0365 1.222E-03 .0355 8.538E-04

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 7/11/73

NASA-RI ORBITER HEATING  
 VA289  
 AEDC(ARO, INC.) ARNOLD AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL R

GROUP CONFIG MODEL MACH NO PO(PSIA) TO(DEG R) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREBEND ROLL-MODEL YAW  
 163 2 ORBITER S 7.98 425.8 1287 30.07 -.44 -30.00 -189.90 5.00  
 T-1NF P-1NF Q-1NF V-1NF RHO-1NF MU-1NF RE/FT MREF STREF  
 IDEG R1 (PSIA) (FT/SEC) (SLUGS/FT3) (LB-SEC/FT2) (FT-L) (R=.0175FT) (R=.0175FT)  
 93.7 .044 1.976 3785 3.070E-05 7.542E-08 1.992E-06 3.446E-02 2.890E-02  
 CAMERA ROLL NO PAINT TEMP (DEG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHOXCK) TRAR(ITO) BETAITO  
 TOP(T) 8218  
 SICE(S) 7212  
 MOTTCH(B) 8521  
 131 82 .0486 6.578E-02 6.1483E-02

PIC NO TIME DELTIVE HITO HITO)/MREF H(-9TO)/MREF M(-913TO) H(-913TO)/MREF ST(ITO)  
 T 2425(131) 10.49 9.54 9.675E-04 .0281 1.184E-03 .0343 1.151E-03 .0334 8.042E-04  
 S 4255(131) 10.89 9.54 9.675E-04 .0281 1.184E-03 .0343 1.151E-03 .0334 8.042E-04  
 R 445(131) 10.89 9.54 9.675E-04 .0281 1.184E-03 .0343 1.151E-03 .0334 8.042E-04  
 T 2426(131) 11.56 10.61 9.171E-04 .0266 1.122E-03 .0326 1.091E-03 .0317 7.622E-04  
 S 6256(131) 11.56 10.61 9.171E-04 .0266 1.122E-03 .0326 1.091E-03 .0317 7.622E-04  
 R 446(131) 11.56 10.61 9.171E-04 .0266 1.122E-03 .0326 1.091E-03 .0317 7.622E-04  
 T 2427(131) 13.04 11.69 8.739E-04 .0254 1.069E-03 .0310 1.040E-03 .0302 7.263E-04  
 S 4257(131) 13.04 11.69 8.739E-04 .0254 1.069E-03 .0310 1.040E-03 .0302 7.263E-04  
 R 447(131) 13.04 11.69 8.739E-04 .0254 1.069E-03 .0310 1.040E-03 .0302 7.263E-04  
 T 2428(131) 14.12 12.77 8.363E-04 .0243 1.023E-03 .0297 9.950E-04 .0289 6.950E-04  
 S 4258(131) 14.12 12.77 8.363E-04 .0243 1.023E-03 .0297 9.950E-04 .0289 6.950E-04  
 R 448(131) 14.12 12.77 8.363E-04 .0243 1.023E-03 .0297 9.950E-04 .0289 6.950E-04  
 T 2429(131) 15.22 13.87 8.041E-04 .0233 9.825E-04 .0285 9.547E-04 .0277 6.666E-04  
 S 6259(131) 15.22 13.87 8.041E-04 .0233 9.825E-04 .0285 9.547E-04 .0277 6.666E-04  
 R 449(131) 15.22 13.87 8.041E-04 .0233 9.825E-04 .0285 9.547E-04 .0277 6.666E-04  
 T 2430(131) 16.27 14.92 7.736E-04 .0224 9.464E-04 .0275 9.205E-04 .0267 6.430E-04  
 S 6260(131) 16.27 14.92 7.736E-04 .0224 9.464E-04 .0275 9.205E-04 .0267 6.430E-04  
 R 450(131) 16.27 14.92 7.736E-04 .0224 9.464E-04 .0275 9.205E-04 .0267 6.430E-04  
 T 2431(131) 17.27 16.02 7.465E-04 .0217 9.133E-04 .0265 8.883E-04 .0258 6.204E-04  
 S 6261(131) 17.27 16.02 7.465E-04 .0217 9.133E-04 .0265 8.883E-04 .0258 6.204E-04  
 R 451(131) 17.27 16.02 7.465E-04 .0217 9.133E-04 .0265 8.883E-04 .0258 6.204E-04  
 T 2432(131) 18.27 17.16 7.227E-04 .0210 8.811E-04 .0256 8.599E-04 .0249 6.004E-04  
 S 4262(131) 18.27 17.16 7.227E-04 .0210 8.811E-04 .0256 8.599E-04 .0249 6.004E-04  
 R 452(131) 18.27 17.16 7.227E-04 .0210 8.811E-04 .0256 8.599E-04 .0249 6.004E-04  
 T 2433(131) 19.27 18.17 7.009E-04 .0203 8.575E-04 .0249 8.340E-04 .0242 5.823E-04  
 S 6263(131) 19.27 18.17 7.009E-04 .0203 8.575E-04 .0249 8.340E-04 .0242 5.823E-04  
 R 453(131) 19.27 18.17 7.009E-04 .0203 8.575E-04 .0249 8.340E-04 .0242 5.823E-04

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7/11/73

# NASA-RI ORBITER HEATING

AEDC(ARO, INC.) ARNOLD AFB, TENNESSEE  
VON KARMAN GAS DYNAMICS FACILITY  
50 INCH HYPERSONIC TUNNEL A

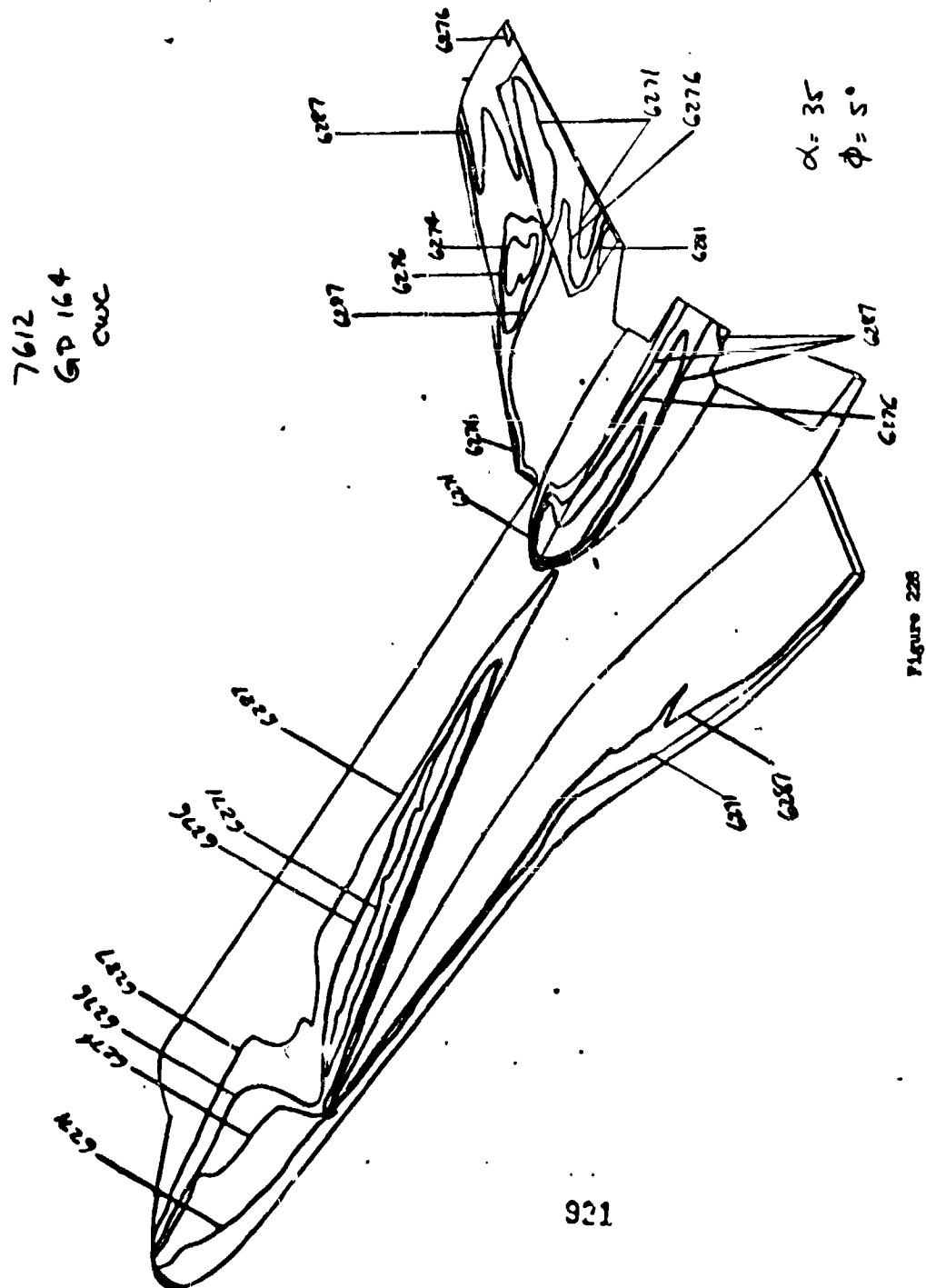
VA2R9

GROUP	CONFIG	MODEL	MACH NO	PO (PSIA)	TO (DEG R)	ALPHA-MODEL	ALPHA-SECTOR	ALPHA-PREBEND	ROLL-MODEL	YAW
163	2	CRESTER S	7.98	426.0	1287	30.07	-0.44	-30.00	-189.90	5.00
T-INF	P-INF	Q-INF	V-INF	RHO-INF	MU-INF	RF/FT	HREF	STREF		
(DEG R)	(PSIA)	(PSIA)	(FT/SEC)	(SLUGS/FT3)	(LB-SEC/FT2)	(FT-1)	(R= .0175FT)	(R= .0175FT)		
93.7	.044	1.977	3765	3.073E-05	7.542E-08	1.693E 06	3.447E-02	2.889E-02		
CAMERA	ROLL NO	PAINT TEMP (DEG F)	INITIAL TEMP (DEG F)	SQUARE ROOT (HMOXCHK)	TBRATIO	BETA(10)				
TOP(T)	4218		82	.0486	6.578E-02	6.1483E-02				
WICFIS)	7212	131								
WOTFM(R)	8527									

PIC NO	TYPE	DELTIME	M(TO)	M(TO)/HREF	M(.910)	M(.910)/HREF	M(.9130)	M(.9130)/HREF	ST(10)
1	2434(131)	20.60	19.25	.0194	8.332E-04	.0242	8.104E-04	.0235	5.658E-04
2	2434(131)	20.60	19.25	.0194	8.332E-04	.0242	8.104E-04	.0235	5.658E-04
3	2434(131)	20.62	19.27	.0197	8.332E-04	.0242	8.098E-04	.0235	5.655E-04
4	2435(131)	21.67	20.33	.0192	8.108E-04	.0235	7.886E-04	.0229	5.506E-04
5	2435(131)	21.67	20.33	.0192	8.108E-04	.0235	7.886E-04	.0229	5.506E-04
6	2435(131)	21.70	20.36	.0192	8.103E-04	.0235	7.881E-04	.0229	5.502E-04
7	2436(131)	22.75	21.40	.0187	7.902E-04	.0229	7.685E-04	.0223	5.365E-04
8	2436(131)	22.78	21.43	.0187	7.897E-04	.0229	7.681E-04	.0223	5.364E-04
9	2436(131)	22.78	21.43	.0187	7.897E-04	.0229	7.681E-04	.0223	5.364E-04
10	2437(131)	23.58	22.50	.0183	7.706E-04	.0224	7.495E-04	.0217	5.233E-04
11	2437(131)	23.58	22.50	.0183	7.706E-04	.0224	7.495E-04	.0217	5.233E-04
12	2437(131)	23.58	22.50	.0183	7.706E-04	.0224	7.495E-04	.0217	5.233E-04
13	2437(131)	23.58	22.50	.0183	7.706E-04	.0224	7.495E-04	.0217	5.233E-04

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Group 114  
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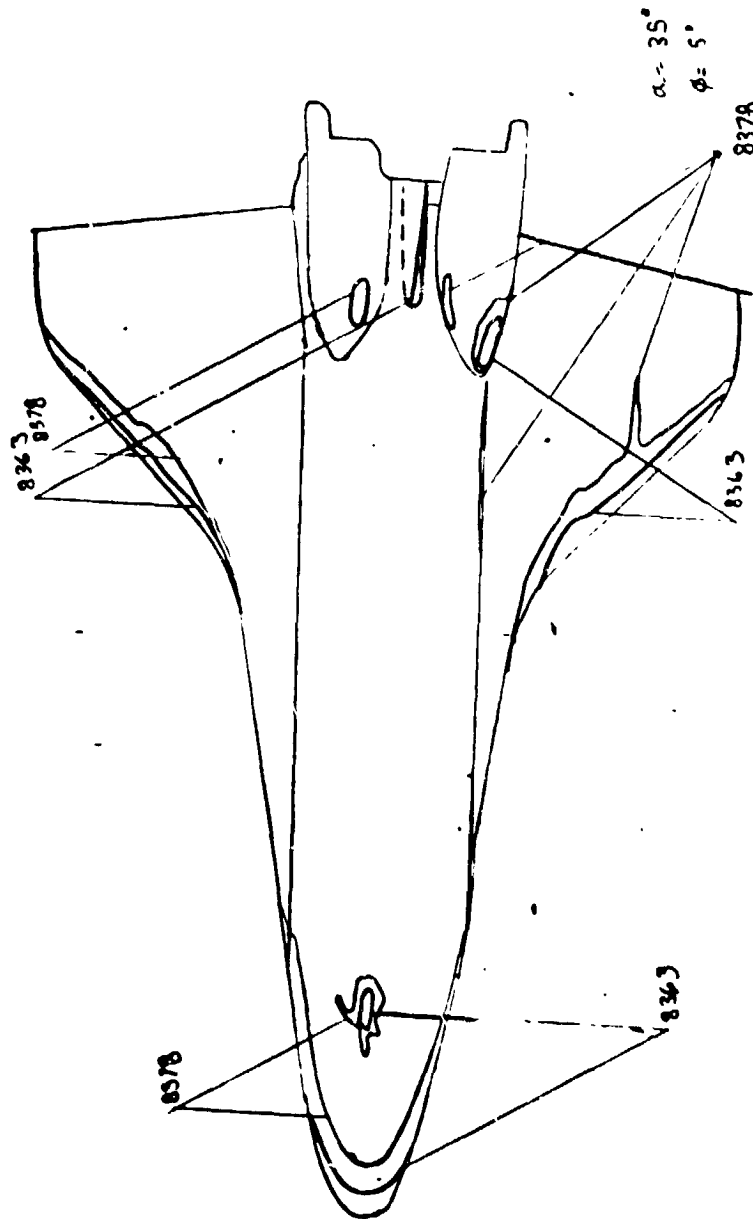


Figure 229



7/11/73

WASH-DC 100-457801-1

AFDC (ARCO, INC.) ARNOLD AFB, TENNESSEE  
VON KARMAN GAS DYNAMICS FACILITY  
50 INCH HYPERSONIC TUNNEL A

6027A

[illegible]

CANFEE	ROLL NO	PAINT IFWP (DEG F)	INITIAL TWP (DEG F)	SQUARE FOOT (SQAFT)	TRAN (TO)	BETA (TO)
TOP (T)	8218					
W/IF (S)	7212	131	81	0.0486		0
W/IF (S)	8527					

PIC NO.	FILE	DELTIME	MUT01	MUT01+REF	MUT01+REF	MUT01+REF	ST(10)
1	2474(131)	1-05	MODEL WAS NOT REACHED	CENTERLINE			
2	2475(131)	1-05	MODEL WAS NOT REACHED	CENTERLINE			
3	2476(131)	1-05	MODEL WAS NOT REACHED	CENTERLINE			
4	2477(131)	1-05	MODEL WAS NOT REACHED	CENTERLINE			
5	2478(131)	1-05	MODEL WAS NOT REACHED	CENTERLINE			
6	2479(131)	1-05	MODEL WAS NOT REACHED	CENTERLINE			
7	2480(131)	1-05	MODEL WAS NOT REACHED	CENTERLINE			
8	2481(131)	1-05	MODEL WAS NOT REACHED	CENTERLINE			
9	2482(131)	1-05	MODEL WAS NOT REACHED	CENTERLINE			
10	2483(131)	1-05	MODEL WAS NOT REACHED	CENTERLINE			
11	2484(131)	1-05	MODEL WAS NOT REACHED	CENTERLINE			
12	2485(131)	1-05	MODEL WAS NOT REACHED	CENTERLINE			
13	2486(131)	1-05	MODEL WAS NOT REACHED	CENTERLINE			
14	2487(131)	1-05	MODEL WAS NOT REACHED	CENTERLINE			
15	2488(131)	1-05	MODEL WAS NOT REACHED	CENTERLINE			
16	2489(131)	1-05	MODEL WAS NOT REACHED	CENTERLINE			
17	2490(131)	1-05	MODEL WAS NOT REACHED	CENTERLINE			
18	2491(131)	1-05	MODEL WAS NOT REACHED	CENTERLINE			
19	2492(131)	1-05	MODEL WAS NOT REACHED	CENTERLINE			
20	2493(131)	1-05	MODEL WAS NOT REACHED	CENTERLINE			
21	2494(131)	1-05	MODEL WAS NOT REACHED	CENTERLINE			
22	2495(131)	1-05	MODEL WAS NOT REACHED	CENTERLINE			
23	2496(131)	1-05	MODEL WAS NOT REACHED	CENTERLINE			
24	2497(131)	1-05	MODEL WAS NOT REACHED	CENTERLINE			
25	2498(131)	1-05	MODEL WAS NOT REACHED	CENTERLINE			
26	2499(131)	1-05	MODEL WAS NOT REACHED	CENTERLINE			
27	2500(131)	1-05	MODEL WAS NOT REACHED	CENTERLINE			
28	2501(131)	1-05	MODEL WAS NOT REACHED	CENTERLINE			
29	2502(131)	1-05	MODEL WAS NOT REACHED	CENTERLINE			
30	2503(131)	1-05	MODEL WAS NOT REACHED	CENTERLINE			
31	2504(131)	1-05	MODEL WAS NOT REACHED	CENTERLINE			
32	2505(131)	1-05	MODEL WAS NOT REACHED	CENTERLINE			
33	2506(131)	1-05	MODEL WAS NOT REACHED	CENTERLINE			
34	2507(131)	1-05	MODEL WAS NOT REACHED	CENTERLINE			
35	2508(131)	1-05	MODEL WAS NOT REACHED	CENTERLINE			
36	2509(131)	1-05	MODEL WAS NOT REACHED	CENTERLINE			
37	2510(131)	1-05	MODEL WAS NOT REACHED	CENTERLINE			
38	2511(131)	1-05	MODEL WAS NOT REACHED	CENTERLINE			
39	2512(131)	1-05	MODEL WAS NOT REACHED	CENTERLINE			
40	2513(131)	1-05	MODEL WAS NOT REACHED	CENTERLINE			
41	2514(131)	1-05	MODEL WAS NOT REACHED	CENTERLINE			
42	2515(131)	1-05	MODEL WAS NOT REACHED	CENTERLINE			
43	2516(131)	1-05	MODEL WAS NOT REACHED	CENTERLINE			
44	2517(131)	1-05	MODEL WAS NOT REACHED	CENTERLINE			
45	2518(131)	1-05	MODEL WAS NOT REACHED	CENTERLINE			
46	2519(131)	1-05	MODEL WAS NOT REACHED	CENTERLINE			
47	2520(131)	1-05	MODEL WAS NOT REACHED	CENTERLINE			
48	2521(131)	1-05	MODEL WAS NOT REACHED	CENTERLINE			
49	2522(131)	1-05	MODEL WAS NOT REACHED	CENTERLINE			
50	2523(131)	1-05	MODEL WAS NOT REACHED	CENTERLINE			
51	2524(131)	1-05	MODEL WAS NOT REACHED	CENTERLINE			
52	2525(131)	1-05	MODEL WAS NOT REACHED	CENTERLINE			
53	2526(131)	1-05	MODEL WAS NOT REACHED	CENTERLINE			
54	2527(131)	1-05	MODEL WAS NOT REACHED	CENTERLINE			
55	2528(131)	1-05	MODEL WAS NOT REACHED	CENTERLINE			

DATA	NOT	YET	VALID
DATA	NOT	YET	VALID
DATA	NOT	YET	VALID

2441(1311)	4.61	3.04	1.79E-03	2.139E-03	.0621	2.034E-03	.0591	1.455E-03
2441(1311)	4.61	3.04	1.79E-03	2.139E-03	.0621	2.034E-03	.0591	1.455E-03
2441(1311)	4.61	3.04	1.79E-03	2.139E-03	.0621	2.034E-03	.0591	1.455E-03
2442(1311)	5.46	4.13	1.54E-03	1.634E-03	.0534	1.749E-03	.0508	1.251E-03
2442(1311)	5.46	4.13	1.54E-03	1.634E-03	.0534	1.749E-03	.0508	1.251E-03
2442(1311)	5.46	4.13	1.54E-03	1.634E-03	.0534	1.749E-03	.0508	1.251E-03
2443(1311)	6.56	5.21	1.340E-03	1.634E-03	.0476	1.558E-03	.0452	1.114E-03
2443(1311)	6.56	5.21	1.340E-03	1.634E-03	.0476	1.558E-03	.0452	1.114E-03
2443(1311)	6.56	5.21	1.340E-03	1.634E-03	.0476	1.558E-03	.0452	1.114E-03
2444(1311)	7.66	6.31	1.217E-03	1.634E-03	.0475	1.554E-03	.0451	1.111E-03
2444(1311)	7.66	6.31	1.217E-03	1.634E-03	.0475	1.554E-03	.0451	1.111E-03
2444(1311)	7.66	6.31	1.217E-03	1.634E-03	.0475	1.554E-03	.0451	1.111E-03
2445(1311)	8.66	7.31	1.217E-03	1.634E-03	.0432	1.415E-03	.0411	1.012E-03
2445(1311)	8.66	7.31	1.217E-03	1.634E-03	.0432	1.415E-03	.0411	1.012E-03
2445(1311)	8.66	7.31	1.217E-03	1.634E-03	.0432	1.415E-03	.0411	1.012E-03
2446(1311)	9.74	8.39	1.255E-03	1.255E-03	.0400	1.308E-03	.0380	9.358E-04
2446(1311)	9.74	8.39	1.255E-03	1.255E-03	.0400	1.308E-03	.0380	9.358E-04
2446(1311)	9.74	8.39	1.255E-03	1.255E-03	.0400	1.308E-03	.0380	9.358E-04
2447(1311)	10.81	9.46	1.01E-03	1.255E-03	.0373	1.225E-03	.0355	8.741E-04
2447(1311)	10.81	9.46	1.01E-03	1.255E-03	.0373	1.225E-03	.0355	8.741E-04
2447(1311)	10.81	9.46	1.01E-03	1.255E-03	.0373	1.225E-03	.0355	8.741E-04
2448(1311)	11.94	10.59	1.01E-03	1.255E-03	.0373	1.225E-03	.0355	8.741E-04
2448(1311)	11.94	10.59	1.01E-03	1.255E-03	.0373	1.225E-03	.0355	8.741E-04
2448(1311)	11.94	10.59	1.01E-03	1.255E-03	.0373	1.225E-03	.0355	8.741E-04

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 7/11/73

AFDC(ADP, INC.) ANNULU AFS, TENNESSEE  
 VON KARMAN GAS DYNAMICS FACILITY  
 50 INCH HYPERSONIC TUNNEL R

WASAP-WI WARTER PEATING

VAPRO

GROUP CONFIG MODEL MACH NO POIS(SIA) TID(EG M) ALPHA-MODEL ALPHA-SECTOR ALPHA-PREBEND ROLL-MODEL YAW

100 2 0-1NF 0-1NF 7.98 425.4 1265 35.06 -5.35 -30.00 -188.70 5.02

T-1NF P-1NF Q-1NF R-1NF MU-1NF W-1NF HOFF SREF

(DEG M) (PSIA) (FT/SEC) (SLUGS/FT<sup>3</sup>) (LH-SEC/FT<sup>2</sup>) (FT-1) (RZ .0175FT) (RZ .0175FT)

93.5 .044 1.974 3702 3.073E-05 7.531E-06 1.995E-06 3.441E-02 2.880E-02

CAMERA 4-OLL NO PAINT (FMP (CTG F) INITIAL TEMP (DEG F) SQUARE ROOT (RHOXCAK) TRAR(ITO) RETAITO)

TOP(FT) 8214

TIME(S) 7212

MULTIPLIER(B) 131

6.721E-02 6.2914E-02

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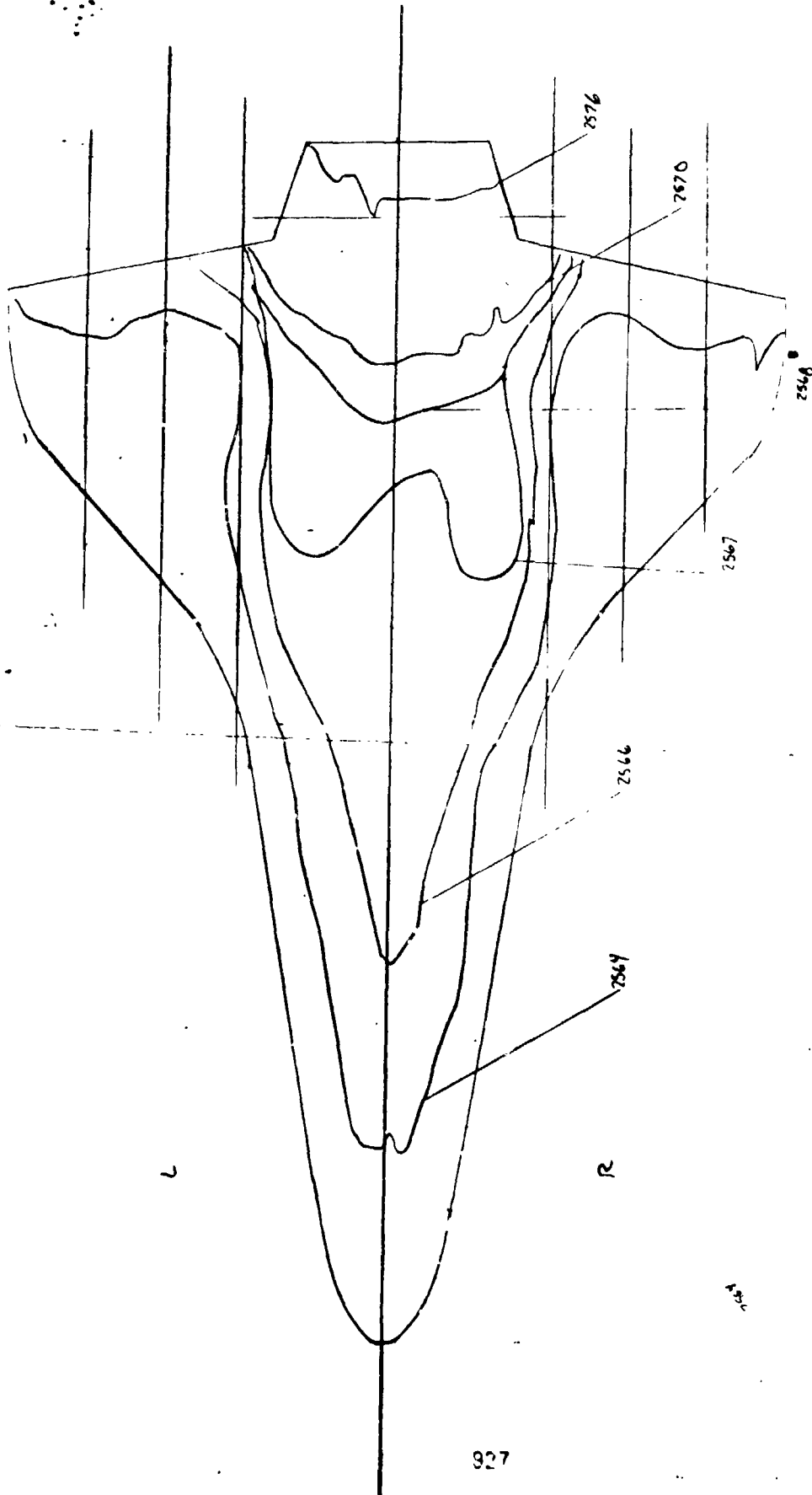
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Group 188  
8013



ump 189  
8013

